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D ITS TREATMENT

E. M. DONATO

1915

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Leprosy in the Philippines and its Treatment

By

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MACÉUTICO DE FILIPINAS, AND EX-SU-
PERNUMERARY SURGEON OF THE
SPANISH ARMY

Translated by Dr. M. Tolentino.

MANILA
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To the illustrious memory of the Filipino scientist, the late Mr. Anacleto del Rosario y Sales, Ex-professor of Pharmacy in the University of Santo Tomas, Manila; Ex-director of the Manila Laboratory; member of several foreign scientific associations, and author of a number of original works on scientific matters, etc.

LEPROSY IN THE PHILIPPINES AND ITS TREATMENT.

By Dr. Eliodoro Mercado y Donato.

Resident Physician in the Leper Department of San Lazaro Hospital, Manila, P. I., Member, and one of the Founder of the Colegio-Médico Farmaceútico de Filipinas, and Ex-Supernumerary Surgeon of the Spanish Army.

INTRODUCTION.

At the instigation of some of my friends and colleagues, I have decided to publish my notes and observations on the subject of leprosy in my small clinic in the leper department of San Lazaro Hospital in this city and to present them in the form of a pamphlet before the Second Regional Assembly (1914), of physicians and pharmacists in the Philippines; thus giving my small contribution to the success of that scientific contest held by my professional countrymen.

This article has nothing in particular and if, perchance, something new or original is found in it, as it proceeds, it is, perhaps, that part which refers to the treatment which I have instituted and in which I can conclusively show that I have been able to cure radically several leper patients with my therapeutical method. Now these lepers show no longer any lesion produced by the disease and have always proved to be negative in all the microscopical examinations made repeatedly and periodically for a long space of time. Some of these lepers have already been discharged from the hospital as cured, while the others are about to be discharged.

Let me state, however, for the sake of fairness, that in my method of treatment, the medicines used are not new but only modified as regards the doses and the mode of application especially of the principal ingredient, chaulmoogra oil. This little explanation is made to give a timely reply to the various comments upon the question as to whether my treatment is original or only a pure imitation. This question has been widely commented upon by the daily press in Manila on account of the fact that the cures claimed as the result of my treatment, have been questioned by some. In this connection, I wish to say, further, that the recoveries thus accomplished are not colored with any kind of pretension on my part, but are the result of my devotion to the sad and long suffering of my patients which has always moved me very deeply.

At the end of this article, I shall present the clinical records of all the patients who have recovered from the disease or show a remarkable sign of improvement, and from these records it will be seen that the treatment employed has produced a positive cure for the ailment as shown by the complete transformation of the lesions, although there are still some cases in which some traces of the disease are as yet perceptible. As a graphical demonstration of my assertion, I shall present also the photographs of a number of the patients. In doing so, I look for no other assistance or protection than the inexhaustible kindness which has always characterized the medical profession in the Philippines to which I wish to confide this incomplete and rather disarranged notes on leprosy in our country.

HISTORY.

To write the history of leprosy in the Philippines is rather a difficult task, because it is impossible to find any accurate information on this subject in a country, like ours, in which the medical science has not begun to show remarkable strides until a few years ago.

It seems that leprosy has existed in this country long before the arrival of the Spaniards, being known by various names by the Filipinos, such as *ketong* by the

Tagalogs, *sánla* by the Visayans and simply *lázaro* by the other inhabitants. Therefore, I am going to follow the method of the foreign authors in writing the history of this disease, which is simply to accept the theory that it has existed from time immemorial.

It is impossible to know with accuracy what treatment was resorted to by our ancestors for leprosy, but we can mention one of their methods which consisted as follows: A hole was made in the ground just enough for one person seated in a chair. The patient was placed in that position in the hole, after which the opening was closed by spreading over it dry leaves and branches of trees which were subsequently covered with earth except at the center where a small opening was made to establish a means of communication between the patient and the "medicine man" and to provide a place through which food could be introduced for the patient. In the hole, the patient had to spend several years according to the prescription of the "medicine man." It was believed that the warmth and moisture that the patient received from the ground were the therapeutic agents to cure the disease. Fortunately, this primitive method of treatment now belongs only to the past and is now of no importance except as a curiosity in the history of medicine in the Philippines.

As every one knows, the San Lazaro Hospital was established for the treatment of lepers, and for this reason, the subject of leprosy is being discussed and studied with real interest and enthusiasm in this country along the lines of medical progress whose tendency has always been to eradicate such a repugnant and loathsome disease to the community.

GEOGRAPHY.

REGIONAL DISTRIBUTION.

At first sight, it seems as if this disease were scattered without predilection as to locality throughout the Philippines, but the data that we have collected from the clinical histories of our patients in San Lazaro plainly show that the majority of the lepers come from those places near the sea, rivers, lakes, and marshes. This finding is fully in accord with the opinions of Hollopeau, Morvan, Zambaco, Pitres, Leloir, Zuriaga, Peterson, and others.

The statistics in San Lazaro Hospital give the following figures:

Lepers from the northern part of the Islands.	757
Lepers from the southern part of the Islands.	2,647

Among the southern islands, Cebu and Leyte occupy first place in so far as the number of their leper inhabitants is concerned. It should be born in mind, however, that these two islands are surrounded by the sea and their towns are nearly all located near the seashore or a river for the reason that their central portions are mountainous and not fit for people to live in. There is, therefore, reason to say, as others claim, that the sea, rivers, and marshes have certain influence in the production of leprosy, due to the iodine derived from the sea and the miasms from the marshes and stagnant waters which tend to open the way for the disease to develop in great proportions.

Perhaps, iodine emanations from the rivers have something to do with the development of leprosy as in many other cutaneous diseases; but the fact is that although the lepers are more frequently found in such localities, this is because these places have been chosen by the lepers themselves as places of refuge, offering as they do ready means for escape whenever they are in danger of being captured, and also convenient bathing places for them especialy at the incipiency of the disease, when they do not know that they have already acquired the disease and think that they have only such slight skin diseases as scabies, ichthyosis, etc., which are atributed to the impurity of the blood and which can be cured by means of baths.

ETIOLOGY.

Although all authorities on leprosy agree as to the real etiological factor in this disease, namely, the bacillus of Hansen, their opinions vary as to the manner in which the disease is transmitted. As they are interesting, and of great importance, I am going to mention those of the most renowned authorities upon this subject.

Danielsen and Hollopeau are with those who believe that, although contagion is a possible transmitting agent, heredity is the most probable mode of infection, at least from the father, as leprous orchitis does not prevent the patient from procreation. They claim with statistical data, that about one-third or one-fourth of the cases show that leprosy existed in the ancestors of the patients. This assertion, however, can not be considered as an absolute fact as those cases in which the disease has been traced in the family, have occured in countries where leprosy is endemic. It may be inferred, therefore, that the mode of infection in this case is only by contagion or by the surrounding, and that the medium of transference of the virus would be removed and the disease would also disappear, if the lepers were isolated, as in the case of the one hundred lepers in Norway who emmigrated to Minnessota: they left their children in Norway and none of them developed leprosy. Another theory in favor of heredity is that the fetus contracts the disease in utero through the placenta as in syphilis, tuberculosis, etc.

Hollopeau, however, admits that the disease may spread in uninfected localities, the infection being due to the arrival in such places of persons with leprosy, as for example, the epidemic in Parcent described by Zuriaga. But he also points out that in the Hospital of Saint Louis in Paris, the lepers were allowed to have free social intercourse with the other patients, and in spite of this, no case of leprosy occured in the latter. In order to prove that leprosy is not a disease that can be transmitted by the inoculation of blood, pus and other secretions from leprous patients, he cites the case of Danielsen who, after inoculating himself four times with blood from some lepers, only obtained negative results. Propito did also the same thing and obtained the same results.

Besnier holds that immigration is the chief carrier of leprosy and mentions the occurrence of leprosy in Europe after the return of the crusaders from the Orient, and the epidemic in the Sandwich islands after the immigration of Chinese to that country.

Dehio (Dorpat), who has an experience of fifteen years in Livonie where he found 937 lepers grouped in small isolated places, says that those cases that seem to be heriditary in origin can be explained in another way. He admits contagion as an evident mode of infection but he does not believe that telluric influences or the food have any thing to do with the development of leprosy, as claimed by others who believe that the exclusive use of fish and mollusks in the diet is one of the causes of the disease. In this connection, Hollopeau mentions the case of the inhabitants of the towns in Central Asia, who, although they do not eat fish, have nevertheless many lepers among them.

Many authors give the theory that mosquitoes, flies, fleas, bedbugs, etc., may transmit the disease. Godhue (Sandwich islands), states that he found the bacilli of leprosy in bedbugs and mosquitoes. However, some investigators made certain experiments to confirm this theory, allowing mosquitoes and bedbugs to bite leprous patients, but they could not find in the blood from the digestive tracts of these insects any bacillus of Hansen. Borrel thinks that the acarus of the skin is the carrier of infection in cancer and leprosy.

Sticker admits that the bacillary cause of leprosy is unquestionable, but he doubts whether man is the only transmitter of the disease or whether certain animals may also act as such.

Lie (Bergen), gives us his observation of a leprous mother who nursed three of her children all of whom became lepers. He believes that this case speaks in favor of direct transmission by the mother's milk without any intermediary host, as in the milk of the mother of these children a large number of Hansen's bacilli were found.

Sandes claims that, considering the great number of Hansen bacilli in the nasal secretions and in the ulcers of lepers, these microorganisms can be easily carried or ingested by flies, mosquitoes, and bedbugs, and the infection is transmitted in this way by these insects although only in exceptional cases. The bedbugs, Acanthia lecturaria, absorbs a great number of bacilli and therefore, it may be one of the principal carriers of infection. In fact, Long E. C. states that he found the bacillus of Hansen in bedbugs and proves that in these insects it can live for a considerable length of time, which fact makes him believe that the bedbug is one of the means of infection in leprosy.

Ehlers, Bourret, and With have found the bacillus of Hansen in insects that were made to bite patients suffering from leprosy, but they also found three acid-resisting bacilli in a flea. The stegomyiae have also furnished a positive case out of seven experiments. Boeck (Christiania), admits that in the stools as well as in the urine of patients with tubercular leprosy, there are many bacilli which can not be found in the stools and urine of those suffering from the anæsthetic form of the disease. The conclusion then, according to this author, is that excrementitious matters afford an important factor in the transmission of leprosy and this should be taken into consideration in the prophylaxis of this disease.

Kirckner (Berlin), in summing up the discussions on this subject, drew the conclussion that the bacillus of Hansen is the real cause of leprosy; that it develops in the human being; and that it is transmitted from one person to another in various ways without any intermediary host being needed as demonstrated by the role played by the sucking insects in the propagation of leprosy.

On the other hand, I am going also to give the varying conditions and circumstances which, in my judgment, contribute to the development of leprosy in the Philippines, based upon my personal observations of lepers admitted to our hospital for treatment, as follows:

Climate.—There seems to be no doubt that tropical climate favors the appearance and development of leprosy, as we can see from the excessive number of lepers in the Philippines and from what can be inferred from the clinical records of the patients, the majority of whom having been living near the seashores, rivers, lakes, and marshes, while the rest in more inland places. This is due, as already explained, to the tendency of the lepers to live in riparian places or near the seashore where they can easily escape in case they are the subject of persecution and where they can attend to their personal cleanliness, although there is no objection to admitting the assertion that the iodine emanations from the sea and the exhallations from lakes and rivers, and bathing in waters used by all kinds of animals, constitute some of the chief factors in the production of this disease, just exactly as in the other cutaneous affections.

Age and sex.—Leprosy occurs between the ages of 7 and 60 years. Cases occurring before the seventh and after the sixtieth year are exceptional. Men are more predisposed than women.

Habits and customs.—Leprosy does not choose its victims as both poor and rich are equally predisposed without distinction as regards habits, and both may thus be stigmatized with the most cruel of all human ailments. It must be noted, however, that the persons who are more prone to contract the disease are those whose work requires them to spend all their time in the sea, such as fishermen, sailors, etc.; those who have to undertake long journeys on foot and who are then suddenly caught by the rain or otherwise get wet unexpectedly while they are tired; those who are constantly subjected to the heat of the sun and this is perhaps because the virulence of the leprosy germs which they may have acquired by heredity and which are lying dormant in their bodies, is excited by the heat; and finally, those women who have the habit of taking a bath during menstruation.

It has never been demonstrated that the use of fish and mollusks in the diet so common in the Philippines has any influence in the development of leprosy, so much so that the disease is known in countries where fish is not used as an article of food.

Previous diseases.—According to the data we possess in the San Lazaro Hospital, the diseases which most predispose to leprosy are lymphatism, syphilis, tuberculosis, scabies, scrofula, etc., while yaws or frambesia seems rather to attenuate it if not curing it altogether.

Heredity and contagion.—There is no question in the assertion that heredity plays an important factor in the production of leprosy, although it is not always easy to trace its influence as the patient may deny its existence in the family, or because he really is ignorant regarding the symptoms of leprosy in its different clinical varieties. In the former case, the hereditary cause of the disease can only be ascertained by putting indirect and ingenious questions to the patient, while in the latter case, it depends entirely upon the ability of the physician to draw conclussions from the past history of the patient.

Like tuberculosis, rabies, glanders, and other diseases, leprosy has a long incubation period and does not manifest itself until it has remained dormant in the individual for a considerable length of time. Danielsen fixes the period of incubation as being ten years, Landouzy as fourteen years, while Bidenkep refers to a case in which the incubation period is twenty-seven years. Hallopeau gives the longest incubation ever known up to the present time, which is thirty-two years.

Sometimes it happens that a person contracts leprosy, while his parents are apparently healthy, which fact makes us infer that he acquired the disease not during intrauterine life but in the outside world and therefore, the case is one of contagion and not of heredity. The fact is that it happens that a child may be saturated with leprosy germs in utero, but the disease does not manifest itself until several years after birth, and although his parents do not show any evidence of leprosy, this is due to their greater resistance, and not because they are free from leprosy microorganisms which they transmit to their offsprings. The antecedents obtained by us of the parents of our patients show conclusively that our contention is based on facts.

Therefore, even though heredity in certain cases is sometimes doubtful, the doubt is not enough to make us hesitate in admitting its influence in the etiology of leprosy. This we can not always do, however, when contagion is the point in question, because contagion is only an obscure possibility and has been questioned by renowned authorities and also by us. In this connection, let us consider the experiments made by Danielsen and Propito and those performed by us in the San Lazaro Hospital. In 1908, we inserted beneath the skin of two monkies, some pieces of leprous tissue, but we obtained negative results, the monkeys failing to show any sign or manifestation of the disease such as we tried to produce.

Suppose leprosy begins to appear in a person who gives no history of contagion; who is well-to-do and strong both physically and mentally; who takes good care of himself and who is always careful in avoiding the association of suspicious persons; how can the appearance of the disease be explained? Where did he get the infection? In this case, he must have contracted leprosy through heredity, the disease beginning to show itself in evidence at a time when he was not in a good state of physical equilibrium, when his individual resistance was such that he could no longer overcome the virulence of the microorganisms. Cases like this, where the etiology is obscure, can perhaps be explained if we accept Besnier's theory that the Hansen bacillus exists in a latent stage within the human body so that each and every one of us has the germ of leprosy waiting for an opportunity to develop in opportune moments. This theory, if true (and fortunately it has never been accepted), would lead to the abandonment of all prophylactic measures established by modern science to prevent the spread of leprosy, and also to the abandonment of the idea of isolating the lepers, either in the hospital or in Culion, as they would be entirely useless and unnecessary.

If it were true that we really have the germ of leprosy in a latent state, we would also be forced to admit that as a consequence of cacochymia, leprosy would spread widely; but such is not the case because the microorganism which is more virulent to the body is the Koch bacillus and not that of Hansen and in spite of this, the lepers having pulmonary tuberculosis had not become tubercular until after they became lepers, when their physical condition was already lowered by leprosy and they could no longer react against the disease.

In many cases of death from leprosy, there are found several complications, such as pneumonia, myocarditis, nephritis, etc., which have contributed to the fatal termination of the disease. From this, we conclude that, in these complicated cases, leprosy serves to prepare the ground for other diseases which will contribute to the death of the patient.

In connection with this, we are going to cite here cases studied by us in the San Lazaro Hospital, where there are some lepers, with the disease already in its attenuated form, who serve as nurses for the others in lieu of some compensation. Their work consists in cutting finger nails, changing clothes and cleaning suppurating ulcers of the other lepers, and yet their condition does not become aggravated, but on the contrary, they continue to improve in spite of their being continually in contact with the patients who are in the worst form of the disease. These cases show conclusively that contagion does not take place even in surroundings that would favor its occurrence as they have not become worse in spite of their close association with the other patients. We can see, therefore, that leprosy is rather not contagious and that Besnier's theory is unfounded.

What we have observed is that leprosy becomes aggravated in those patients who are attacked with uncontrollable sexual desire, while those who can dominate it show a marked progress in the improvement of the disease. This fact gives us a very important point in the prophylaxis and treatment of leprosy, which should be taken into consideration by every one who works for the alleviation of suffering and curing of diseases.

According to our opinion, then, the evolution of leprosy begins from the time a factor of unquestionable leprous origin produces a pathognomonic sign of the disease. This factor may be either heredity or, secondarily, contagion, the latter developing the malady only in a very limited number of cases where the predisposition is great. Any doubt as to the part played by heredity will be cleared up by reading the clinical records of the patients which evidently show either direct or remote relation existing between the patient and his ancestors who suffered from the same disease.

A careful investigation into the antecedents of many leprous patients will reveal cases such as follows:

The patient was working as a washerwoman for Mr. P. C. in Cebu, who had a son suffering from leprosy which was kept secret until the latter died. After several years, the washerwoman noticed on her body the appearance of the first manifestation of leprosy which she attributed, of course, to contagion from her customer's clothings. Everybody who saw her thought likewise. Her mother gave birth later to another girl who, at the age of 6 years, became also a leper, in spite of the fact that the washerwoman and her mother had never seen each other for several years before her sister was born, because she was not living with her for some reason which we need not mention here. This fact excludes the idea of contagion to which the washerwoman ascribed her condition, and those who at first thought with her that the latter was due to contagion changed their opinion afterwards.

No matter how much we would apply to this particular case the theory of contagion, we think that Besnier's theory played but a very little part in it, and say that Mr. P. C.'s clothes or his sons served only to excite the virulence of the leprosy microorganisms that lay dormant in the washerwoman's system, resulting in the development of the disease. As to her sister's condition, what irritant then provoked its appearance? This can be answered only by saying that probably there is no influencing factor in this case other than heredity from one of her parents or both.

SYMPTOMATOLOGY AND CLINICAL FORMS.

Leprosy manifests itself in different clinical forms. In some cases, it presents itself in the form of tuberculous neoplasms that develop in the outer layer of the integument; in others, it is in the form of disturbances of the sensory and trophic nerves, thus showing that there is disarrangement of the peripheral nervous system. For this reason, Robinson (1819) divides leprosy into two forms: The tuberculous and the anesthetic, a classification accepted by other authors with the exception of Hallopeau who adds the mixed form, where the other two are found existing simultaneously. The mixed form manifests itself usually during the first stages of the disease, that is, during its evolutionary period, as is frequently observed in San Lazaro Hospital.

Leloir agrees with the first two forms which he calls the systematized tegumentary and the nervous forms. Hansen and Loof call them tuberous and maculo-anesthetic respectively; while Unna divides the cutaneous form into lepromatous and neurolepric. These two forms are observed during the prodromal stage or period of invasion, and have been described by Danielsen Beeck and Leloir.

Period of invasion or prodromal stage.—The disease begins sometimes as an isolated spot which persists for many years without any tendency to spread to other parts of the body. In general, the most important symptoms are prostration or sensation of weakness, heaviness, apathy, depression, and uncontrollable desire to sleep. Simultaneously with these symptoms we also observe rheumatic pains, contracture and formication in the extremities, rise of temperature in the evening, usually of short duration, and ushered in by chills, sensation of dryness in the nose, epistaxis, and the suppression of perspiration in certain parts of the body. Together with these symptoms, there are digestive disorders such as dyspepsia, nausea, vomiting, and sometimes loss of appetite and gastralgia. These symptoms are rarely found occurring together in the same patient, so that they as a whole, do not in any way form a basis for the diagnosis of leprosy.

Tubercular leprosy.—This form is called tegumentary leprosy by Leloir, tuberous leprosy by Hansen and Loof, and lepromatous leprosy by Unna. It has two stages, the macular and the nodular. In the former, the eruptions may appear either erythematous or macular and in some cases they begin in the form of tubercular emminences. The rule, however, is that during the first stages of the disease, the eruptions appear as macules and are accompanied by the appearance of vascular erythematous patches and pigmented spots. The nature of these vascular spots is similar to that of the chief forms of erythema, that is, they vary in size from that of a lentil to that of the palm of the hand or even larger; their borders are prominent; their color, if not red, is violaceous, deep red or dark red. The intensity of their color may be increased by cold, or heat, and also during digestion. The eruptions, whether macular or papular, appear oily, smooth and shiny, due to the hypersecretion of sebaceous matter. Sometimes they appear in the form of irregularly shapped rings, which are tan-colored, yellowish, dark, or almost black or slate-colored, or appear normal in color, or show some decoloration in the center.

These spots appear with predilection upon the exposed portions of the body, such as, the face and the hands as well as upon those regions which are more subjected to pressure, such as the elbow, the buttock and the knee; but it is not true that the spots are symmetrical as described by all the authors, or that they seldom appear upon the body and the extremities. In the course of time, they affect the nutrition of the skin to a great extent, and one of the first disorders of the nutrition of the skin, which characterizes this disease, is the falling out of the hair. As the disease generally begins on the face, the eyebrows shed before the other hairs of the body, thus disfiguring the features of the patient. The hair of the axillae, pubis, etc., falls out as that of the eyebrows, and the hairs of the head usually become thin and moniliform and break very easily near their roots when an attempt is made to pull them out.

The nails also show some changes which appear coincidentally with the macular eruptions upon the dorsum of the hands and feet. The nails appear with wrinkled surfaces and with a reduction in thickness due to the incomplete keratinization of the layers beneath the corneus or upper layer, while in some cases, they fall out altogether.

The erythematous spots appear in crops at varying intervals and they are frequently accompanied by fever, which may be high or low, sometimes so low that the patient is not aware of it.

As the disease advances, the spots become darker and more persistent with the induration of the dermis, and the eruptive patches become more prominent. Finally the lesions are transformed into tubercles, and the first period of the disease is thus brought to an end.

The cutaneous sensations may be altered in various ways in the areas where the lesions appear. We find that in the vascular spots already mentioned, itching, formication and pain are almost always present, causing a great amount of annoyance to the patient. These sensations may not be so acute at the beginning, and may also disappear altogether during the advanced stage of the disease when some perturbance of the tactile sensations, either those of pain or temperature, is observed.

The tubercular stage, in which the lesions are almost exclusively erythematous in character, may last for several weeks, months, or years.

The nodular period.—During the period, we find around the borders of the macular eruptions some neoplasms which develop very slowly and may or may not be accompanied with fever of varying intensity. These neoplasms, which at times are in the form of infiltrations, extend more or less into the integument, but generally they grow upon the surface of the skin and are frequently found isolated in various sizes.

Both forms, that is, the tubercular and the nodular, penetrate the dermis and the epidermis and only in a few instances are they found in the subcutaneous tissue. The nodules vary in size, from that of a hempseed to that of a walnut, and in appearance they also vary as some resemble a lipoma, while the others are hard as a fibroma. They develop slowly and form on the skin large ulcers which persist more or less indefinitely. They also present an indefinite outline and sometimes they coalesce extending imperceptibly to the surrounding healthy parts of the skin or to the infiltrated areas. At first they are of the discrete type; later they multiply forming groups, although they are frequently found in semiannular arrangements. The lesions may invade extensive areas giving rise to what Basin called leprous scleroderma.

The spots as well as the nodules show much predilection upon the face and other exposed surfaces of the body, where they are especially large. Their color is usually red, yellow, or violaceous, which disappears on pressure, but at times they appear black, especially those found upon the trunk, as those upon the face are generally of livid or yellowish hue.

The skin covering these tubercular lesions is shiny and oily, and there is an abundant secretion of sebaceous matter around the erythematous spots. Sometimes, the affected areas of the skin show a desquamation like that observed in ichthyosis, pelagra, ptyriasis or psoriasis, and sometimes, there are some dilated veins near the tubercles, which exceed the latter both in size and in growth.

The tubercular growths, occasionally, become swollen, painful, and bright red in color. This occurrence is associated with inflamation of the articulations near-by. Then, the tubercles are covered with vesicles containing a clear, sanguinolent fluid. These phenomena are accompanied by a rise of temperature above 40° C., dryness of the tongue, delirium and an intense adynamia, all of which tend to aggravate the condition of the patient and to increase the number as well as the size of the tubercles.

We seldom find the patients complain of pain or pruritus in the tubercles, and according to Hallopeau, a more or less pronounced anesthesia is more frequently observed, although it is not constantly present. The anesthesia develops usually in the macular eruptions, but it is not present in the tubercular nodules, at least during the first stages of their development, and when later it appears, the patients feel sometimes tactile sensations but no pain, or viceversa. The temperature sense may also be altered either alone or associated with alteration of the other sensations. The anesthesia becomes deeper as the disease advances; but in some cases, it diminishes instead. When the anesthesia is complete, the patients may have trauma or burn without knowing it, such accidental lesions being generally found on the soles of the feet especially upon the heels.

In the course of the development of these lepromatas or leprous tubercles, there may be found other changes, among which is the gradual atrophy of these lesions, leaving in their places dark scars or folds which may be prominent or depressed, a change which is not uncommonly observed. If this does not occur, the tubercles become inflammed and start a process of suppuration followed by ulceration. Such changes usually appear upon the soles of the feet, being similar to the perforating ulcer, and the ulcers invade even the subjacent tissues and are very hard to heal. Sometimes the ulcers extend as far as the bones.

When the ulcers are not deep, being only the result of superficial erythematous eruptions, they are usually found upon the dorsum of the matacarpho-phalingeal joints, the borders of the nails and the finger-tips. They appear with irregular, wrinkled, swollen borders, and yellowish sanious floor.

When the infiltrated areas become atrophied, they shrink and become sclerotic, thus deforming and separating various parts of the body.

The mucosa is also a place of predilection for the eruptions so that we find them also on the conjuntiva, the pituitary membrane, the mucous membrane of the mouth, throat, and larynx. The conjunctiva seldom escapes, being affected during the first stages of the disease. The symptoms are identical in all respects with those associated with the cutaneous eruptions, to which should be added those disturbances characteristic to mucous membranes, namely, vascular injection, pain, redness, tumefaction, photophobia, and constant lachrymation. The blood vessels of the conjunctiva are dotted with punctiform nodules, and we usually find all over the membrane large tubercular nodules which secrete a muco-purulent fluid.

These conjunctival eruptions usually spread to the cornea and the iris. Hansen and Loock said that "the inflamation of the cornea starts with a slight dimness of vision and the formation of a very small vascular spot on the upper part of the membrane. Later on, this spot increases in size spreading to the borders of the membrane, but the inner surface is generally not invaded and finally the whole surface is involved showing an intense infection of the part and the presence of infiltrations which are either nodular or smooth in appearance. The infiltrations, as the disease advances, become yellowish-white, thick and uneven; thus causing a total loss of vision. As a rule, these lesions do not last long but they leave as a consequence permanent opacities and it is not uncommon for a staphyloma to develop. The lesions found in the subjacent parts sometimes are the result of the changes in the surface such as we have just described, and the corneal tubercles, for example, may undergo softening or suppuration leading to perforation and to destruction of the eyeball. In many cases, the nodules develop insidiously in the iris, deforming the pupil and preventing its dilatation; at the same time, adhesions are formed between the iris and the cornea or between the former and the lens, and vision has to suffer also in many different ways from so many changes. The patient is attacked with amblyopia which ends either slowly or rapidly in a total blindness, and with an intense pain around the orbits on account of the inflamation of the iris."

The pituitary membrane is also, as already said, a frequent seat of this affection undergoing the same changes as the other mucous membranes, namely, tumefaction, and intense injections leading to ulcerations which produce a muco-purulent secretion which later hardens forming a hard crust, which interferes with respiration.

The ulcers finally become deeper and involve the bones of the nose producing perforations and deformities of the organ, but the sense of smell remain unaffected. However, our experience with the patients in San Lazaro reveals the contrary, as we have found that all of them show the loss of the sense of smell from the time the disease has begun to show itself in the nose.

The mucous membrane of the mouth is also the seat of leprous tubercles which differ in size, form, and appearance having the same characteristics as those formed upon the skin. The inner surface of the checks shows some opalescent furrows, while the palate is the most frequent location for the nodules which in the course of time undergo softening and ulceration.

The tongue appears swollen with nodular granulations and vegetating ulcerations which impede the movements of this organ and cause abundant salivation due to the hyperemia of the salivary glands. However, the sense of taste is not abolished and many patients retain it to the end.

The lips become swollen also so that they are everted disfiguring the patient to a great extent in that way.

When the ulcers in the mucosa of the mouth become more extensive involving even the bones, they deform the buccal cavity, as they penetrate into the surrounding tissues so terribly as to suggest the destruction of tissues and deformities caused by syphilitic tumors. The larynx, the pharynx, the epiglottis and the vocal cords do not escape such changes, bringing about as the result such changes as dysphonia, fatal dyspnea and even asphyxia, which become aggravated at the slightest exertion made by the patient.

The sense of hearing is likewise affected due to the extension of the lesions from the nasal cavities, and as a result deafness is produced.

The vulval and anal mucosa may also be affected in the same manner as the mucosa of the eyes, nose, and mouth.

The lymphatic glands become swollen and hard, but they do not suppurate nor form ulcers. These glandular indurations, however, have not been found in any of the cases submitted to us for treatment.

Acute leprous orchitis is more frequently met with in our clinic at the hospital. The epididymis and the testicles are the organs affected, especially the latter in which small sclerotic nodules are found on palpation after the subsidence of the inflamation. Leprous changes are also found in the scrotum. In spite of these pathological manifestations in the testicles, sexual desire is increased from the beginning of the disease to its most advanced stage.

Clinical picture and evolution.—The disease is characterized by being first slow and later rapid in its progress, and between these two phases of its evolution, the symptoms seems to improve and the patient finds himself apparently much relieved.

The patient shows on his face the manifestations of the disease with the exception of a narrow space between the forhead and the scalp. The forehead is traversed by deep furrows running vertically and transversely between the tubercular infiltrations. The hair of the eyebrows falls out, while the latter become so prominent as to almost overshadow the eyes. The nose is separated from the enlarged infiltrated forehead by a deep transverse groove. The cheeks which are swollen by the infiltrations and the tubercular growths seem to have been varnished with a greasy substance. The lips, especially the inferior, are turned outwards and the secretion of saliva is increased. The chin is also the seat of the disease being very much disfigured, and the beard falls out. The ears are enlarged showing nodules, while their folds and lobules become pendulous due to the thick and hard infiltrations. The part less affected is ordinarily the trunk which shows only some pigmented spots and tubercular infiltrations at the level of the base of the thorax on each side. The gluteal region, however, is more frequently the seat of large tubercles and extensive infiltrations, due perhaps to the constant pressure to which it is subjected.

The upper extremities are more frequently affected at the level of the elbow and upon the hands, especially the fingers, which ulcerate producing scars which lead to the formation of deformities of various kinds, such as clubhand and others.

The lower extremities are mostly affected upon the thighs, knees, and legs, where more or less extensive and prominent tubercular infiltrations are found. The lesion that is found upon the feet, is special and characteristic and consists in the considerable thickening of the epidermis.

The general condition of the patient is that of great depression which becomes more accentuated at each exacerbation of the disease, and when the advanced period is reached, the adynamic condition of the patient becomes more pronounced, the fever rises, and the ulcers become worse until he succumbs to marasmus and cachexia which lead to his fatal termination which is brought about by the intercurrence of many complications, such as nephritis, pneumonia and pulmonary tuberculosis.

Anesthetic form.—In this form, the nervous manifestations predominate, while the period of invasion takes place in the same manner as in the tubercular form. During the height of the disease, the blood vessels are engorged discoloring the skin, vesicular eruptions appear and changes in the sensory and motor nervous systems develop. It is often observed that erythematous patches follow the course of a nerve as in herpes zoster (Danielsen).

These lesions are scattered in various forms and sizes so that we find them sometimes in the form of plaques as in psoriatic and mycotic erythrodermia, sometimes as more or less prominent eruptions as in the different varieties of erythema, and occasionally they resemble erysipelas, or produce a serous exudation like pemphygus.

All these eruptions are accompanied with anesthesia of the affected parts and itching although the latter is complained of only at times. The appearance of these eruptions is also accompanied by febrile reaction of varying intensity, and digestive disturbances which are so excessive as to suggest the presence of a complicating enanthema. As a consequence of the vomiting and diarrhea, the patient sinks into an extreme prostration and becomes very thin, while the trophic disturbances become aggravated producing decoloration of the skin in the center of the plaques which present a slightly dark circle around their borders. Besides these changes, the attention is also called to the suppression of perspiration and to the neuralgic pains in the extremities and the head, which may be the only manifestations of the disease for many years.

The pigmented spots are frequently accompanied or preceded by vesicular eruptions, which fact has led some writers to consider the latter as prodromic symptoms of the disease, appearing often at the tips of the fingers and toes and extending to the dorsal surface of the feet or hands, wrists, ankles, knees, and elbows.

At times these eruptions are policyclic, causing a febrile reaction which is so intense as to surpass all the other leprous manifestations. Their size varies from that of a hempseed to that of a wallnut or even larger, and they are frequently surrounded by an erythematous area which is more or less extensive and pronounced, and which sometimes precedes, but more commonly follows, the appearance of the vesicles which contain a serous fluid mixed with red blood cells, and becomes viscid or purulent during the later stages.

When the blisters rupture and their contents escape, a crust which is generally thin is formed. The crusts, when hard and thick, present a yellowish color. Sometimes they look like diphtheritic pseudomembranes. When these crusts fall off, they leave behind them either only pigmented areas, or pale white scars having a smoth, shining surface and borders, which, according to Leloir, look as if they had been surrounded by a narrow band of scot or sepia.

The dermis under the blisters very rarely becomes scarified, and in a period of from twelve to fifteen days, the affected part falls off, leaving a grayish scar of irregular form which is somewhat depressed, and which later on may become keloid.

One of the other early symptoms of the disease is the thickening of the nerves. This is what occurs with the cubital nerve which can be felt at the olecranian fossa as a thick, hard and uneven cord, reaching as far as the middle of the arm. This enlargement of the nerves can also be found in their smallest ramifications, and can be felt readily owing to their relative hardness. The induration of the nerves starts at the peripheral branches, being the first to cause the disturbances in pigmentation and the accompanying pains and to bring on disturbances in the sensory, motor, and trophic nervous systems.

The cubital, sciatic, and trigeminal nerves, are usually the first affected by the invasion of the disease which spreads later on to the nerve trunks and branches which originate from them, producing intense pains which run through all the nerve tracks. Sometimes, only a febrile reaction announces the invasion of the disease.

When the patient suffers from hyperesthesia, he is troubled by a continuous pain which is produced by the least contact of the body, whether at the level of the pigmentary distrophies or in the regions which seem apparently healthy. When such hyperesthesia appears at the soles of the feet, the patient feels, when walking, as if he were treading upon pointed nails or broken glass. Whenever such troublesome pain occurs during the course of the disease, it always indicates the propagation of the disease to other nervous regions.

The sensations experimented by the patients are of various kinds. Sometimes they are in the form of sharp pains, sometimes in the form of cold or burning sensation and finally they may be felt as electric shocks.

The hyperesthesia is followed by anesthesia which is preceded by a sensation of ant-crawling, itching, or numbness. This suppression of sensibility appears first in the acromic patches, but it is also found in the unaffected regions.

The change of sensation begins from the extremities, usually from the inner surface of the fingers and toes, and then it extends gradually to the arms and legs.

There is disassociation of sensibility. The painful tactile and thermic sensations may be disturbed separately or simultaneously, and the former may be entirely absent or only lessened in its different manifestations.

The slowness of the perception of cold or pain has also been verified in the patients, and the complete loss of sensation prevents them from avoiding various accidents, such as serious burns, for example. Reflex sensibility also disappears, including the rotulian reflexes, and when the anæsthesia appears in the conjunctiva, the contractibility of the lachrymal apparatus disappears.

These things which occur in the sensory filaments are not observed in the motor fibers, where we fail to find any paralysis or motor disturbance unless a concomitant muscular atrophy is present, and whenever there is paralysis in the motor areas, it is only limited to the area of distribution of the terminal branches.

The regions invaded by paralysis are: The face, often affecting the muscles of the eye, causing thereby different kinds of strabismus; the upper extremities and the fingers, which are deformed in many ways, producing such affections as clubbed hand which interferes in such movements as catching and writing; the lower extremities, which give rise to disorders of walking.

Trophic disturbances take place in the skin and mucosa, as well as in the muscles and the skeleton. These disturbances usually invade some of the muscles during the algid period of the disease and it is common to find the thenar and hypothenar eminences atrophied, a fact which, according to Hansen, may be taken as a general rule. Nevertheless, Hallopeau has found in a case of anæsthetic leprosy that these eminences persist in spite of the deformation of the hands. (Hallopeau, Soc. Franc. de Dermat. et de Syphil., 1894.)

The amyotrophia which appears in every region at the same time as the paralysis and the muscular and tegumentary retractions produce very pronounced deformations of various kinds, such as clubbed hand. The fingers undergo a still more marked deviation such as lateral curvatures, or curving with the concavity upon the upper surface. The hands are frequently placed in a forced flexion, or extension toward the forearm; the same thing may be said of the feet which may be extended or bent upon the legs by the peroneal muscles (leprous varus of Lorand). Sometimes such alterations affect the muscles of the trunk, especially the deltoid.

The skeleton also takes part in these trophic disturbances, either primarily or as a consequence of the alterations in the integuments and the elimination of more or less extensive sequestra, which gives rise to an abundant suppuration which weakens the organism especially when it causes the falling off of the fingers and toes. In these cases the fingers take the form of a spindle, which Lorand calls the "leprous spine."

The loss of the phalanges, the entire hand or foot, is frequently due to gangrene which produces all kinds of mutilations. Sometimes on account of an interstitial rearbsorption, the destruction of the skeleton is enhanced, and the bones undergo a gradual diminution in volume until they disappear entirely.

The nails begin by losing their natural brightness; then they become thin and wrinkled and finally, they are covered by a keratinized coat. These modifications are ascribed by Danielsen to an alteration in the nail matrix.

In the anæsthetic form, the mucosæ become also affected as in the tuberculous type of the disease so that when the pituitary membrane becomes ulcerated, the ulcer may extend to the bones of the nose, deforming them as in the tubercular form. When the gingival mucosa is affected, the gum becomes atrophied and the teeth fall off.

And when such lesions of the mucosæ extend themselves to the epithelia of the digestive system, they give rise to general disorders, such as intense gastralgia, diarrhea, and uncontrollable vomiting. The alterations in the other organs are manifested by pericarditis, albuminuria, pleurisy, pulmonary tuberculosis, peritonitis, hepatitis, etc.

But, in spite of these complications which usually appear during the evolution of the anæsthetic form of leprosy, it often occurs that the patients, in spite of their cachexia and utter depression, manage to go through a long life of suffering, either blind or paralytic, and only when a very grave complication as septicemia or nephritis occurs at the middle or toward the end of the progress of the disease, that they succumb to it.

It should be taken into account that the disease, no matter in what form it developes, does not maintain to the end its exclusive character but becomes complicated with the other form.

It often occurs in the tubercular leprosy that during the time the disease is developing, the tubercles shrink so that the only symptoms that prevail are those of anæsthetic leprosy.

Cases are mentioned of remissions of the disease for a shorter or longer period, in which the symptoms seem to be mitigated and in which the cutaneous manifestations disappear, but this only lasts for some time, as we have already said, only to reappear afterward vigorously than before with all the symptomatologic picture of the disease.

In our hospital clinic we have observed several cases of anæsthetic leprosy without any erythematous spots, nor adynamia, nor any nervous disturbance, merely showing an ulcer of indolent character upon the soles of the feet or upon the palms of the hands. Such ulcers have the form of a funnel which has been imbeded in the affected part, that is, its base corresponds to the sole or plantar surface. From its bottom and interior surface it secretes a serous and very fetid reddish fluid. The borders of the ulcer are thick as if they were made to prevent the lesion from growing larger and to concentrate all of its destructive power within its walls until it perforates the region affected, going through all the tissues and organs it finds on its way, as in the case when it affects one or more articular capsules producing various desarticulations, or perforating a blood vessel which gives rise to hemorrhage.

When these ulcers are healed, either after treatment or spontaneously, the other more culminant symptoms of leprosy which before have been lying dormant, namely, fever, macules, debility, and other symptoms which characterize each access of the disease, make their appearance. Furthermore, it is then that the bacilli of Hansen are found in the patient, which is not the case when he has only the ulcers as described above.

Frambesia (yaws, "bubas"), has a very particular influence in the evolution and termination of leprosy, as from my observations in the hospital, I have been able to conclude that when frambesia concurs with leprosy, it attenuates the latter in its symptomatology, thus predisposing to a cure which has never been expected. In this connection, I am going to mention here some of the cases which I have observed and selected in 1901:

CASE 1. A boy 12 years of age, named R. R., a native of Ermita, Manila, with evident heredity of leprosy (from an uncle and a sister, both deceased). He was admitted to the hospital with symptoms of tubercular leprosy, extending almost throughout the whole body, and with aphonia. The microscopical examination revealed the presence of Hansen bacilli. Two years after his admission to the hospital, the disease became complicated with frambesia which was treated and cured by the external use of copper sulphate and other indicated medicines which were directed principally to the treatment of the intercurrent disease and not to the principal affection, leprosy. Ten years afterwards, the patient was discharged from the hospital as cured from frambesia as well as from leprosy.

CASE 2. The patient is about the same age as the first, named M. A., a native of Tambobong, Malabon. He had a female leprous cousin in the hospital. He was admitted with tubercular patches in the face and ears. Sometime afterwards he developed frambesia by contagion from patient No. 1. He was cured in the same way and after the disappearance of the frambesia tubercles, there was also noted the disappearance of the tubercular maculae, although the blood examination still showed the presence of Hansen bacilli.

CASE 3. C. B., female, 50 years of age, a native of Binondo, Manila; had a leprous daughter. This woman presented leprous patches on the face and of vitiligo in other parts of the body, and in the microscopical examination, she was positive to leprosy. She contracted leprosy from nursing some of the leper patients, as she was working as an assistant nurse, and at the end of two years, by means of an adequate treatment against leprosy, and entirely disregarding the complication which seemed to give an apparent improvement to the principal disease, she was cured from leprosy, although frambesia still continued to develop for a long time after she had been discharged from the hospital. The absence of the Hansen bacillus was verified by microscopical examinations.

CASE 4. A. C., a girl of 7 years, native of Binondo, Manila, presented patches upon the face and ears. Microscopically, the case was diagnosed as leprosy. She was one of those who had been nursed by the patient C. B. Five years later the girls developed frambesia uniformly scattered all over the whole body. At the end of twenty months with this complication, all the leprous patches became attenuated progressively until they completely disappeared and the microscope revealed a considerable diminution of the leper bacilli, which were found only scattered in the blood in the majority of the examination made. In the experiments made for the treatment of leprosy with the X-ray, this girl was submitted to the electric treatment from which we observed an improvement of the frambesia on the one hand but a marked reappearance, on the other hand, of the leprous patches which she had at the time of her admission. As she was becoming worse from day to day she was transferred to Culion Leper Colony.

As will be seen from these cases, the association of the spirocheta of frambesia with the bacillus of Hansen predisposes to the cure of the two diseases, which is not the case with the association of the leper bacillus with other microorganisms, such as that of tuberculosis, for example, in which the results are nothing but injurious and fatal to the patient.

PATHOLOGICAL ANATOMY.

The pathological anatomy of the disease has been undertaken by many authors and from their observations, we have drawn the following description:

In a leprous neoplasia, there are found groups, either isolated or very united, of leucocytes, round or fusiform epithelial cells contain several nuclei which assume the shape of the giant cells or resemble those of the myeloplaxes, and they are also the seat of vacuoles as first described by Virchow.

When these elements are found in an old leprous lesion, they are usually separated by a connective fibrinous tissue.

The vessels are dilated and their walls are very much thickened. This considerable dilatation of the vessels is due to a local anemia caused by the obstable that is produced by the neoplasms to the peripheral circulation; thus causing a great amount of blood to accumulate in certain points of the vascular system.

There are also found some large groups in the form of globules with vacuoles, which are nothing more than conglomerations of bacilli which are grouped together on account of the mucus secreted by their capsules.

To Unna, these supposed cells are not isolated elements, but rather the nodules of a network which is distributed in an irregular form in the meshes of the tissues and the lymphatic vessels. Kunn is in favor of this opinion which up to the present time is still under discussion.

The pathogenic germ of leprosy was observed for the first time by Hansen in 1871. It is a bacillus measuring from 3 to 4 μ in length and 1 μ in width with one end enlarged so that the bacillus resembles a nail. Sometimes it is straight, and sometimes long and flexuose like the Koch bacillus, but it is very seldom intercellular, and usually not so numerous as the latter.

The Hansen bacilli are either isolated or in groups of two or three. When stained by the Ehrlich process, some small clear points are found within which, according to some writers, are spores, but to others, are points of degeneration. These bright points do not take the stain when the bacilli are from an old lesion. The bacilli form compact and varied groups and they dissociate in granular heaps.

The cultures of the bacilli cultivated by Babes, Ducrey, Campana, and Boinet, have not yet been verified, for although these scientists have been able to cultivate some bacilli resembling those of leprosy, their reaction to coloring substances were different.

It is the opinion of the majority of the authors that the bacilli are absorbed by the cells in which they live and when the cells disintegrate, the bacilli are left free in the interstices of the tissues, producing an increase of the pathological condition of the patient which is only attenuated when the bacilli are again absorbed by phagocytic cells or surrounded by the mucous substance secreted by their walls. According to Unna, every leprous lesion originates from a bacillary embolism.

The site and the character of the lesions vary according to the form of the disease in which they are found. The leprous tubercles affect the whole thickness of the dermis which is infiltrated by cells forming irregular masses. The sebaceous and sweat glands are also invaded and found to be more or less atrophied. But Unna holds that these glands do not favor the lodgement of the bacilli in them due to their secretion and that they only contain some rounded corpuscles which give the same reaction as the bacilli. According to Babes, the bacilli are found in the bulbs of the hair, in their inner walls, in the space that separates them from the hair, between the cells surrounding them and also upon the surface of the integument at the level of the hair follicles. (Babes Arch. de Phisiol., 1883.) The cellular infiltrations are principally found near the glands and along the course of the blood and lymphatic vessels. The bacilli are also found in the sweat pores and around the pilosebaceous openings and also in the pus cells and in those that form the tubercles. There are also numerous bacilli found in the engorged vessels of the erythematous macules, in the content of the blisters, and Soudakewitsch found them also in the coats of the Pacini corpuscles and in the sheaths of the small nerves of the skin.

In the more advanced stages of the disease, a considerable diminution of red corpuscles and hemoglobin has been observed.

The ulcers are more destructive when they are situated in the epithelium than when they are in the skin. A considerable number of bacilli are found in the epithelial cells of the cornea and in the interstices of the tissues extending as far as the inner layer, between the elements of new formation.

The inflamation of the larynx may be diffuse or nodular and affects the epiglottis, the vocal cords, and the ventricular bands causing at times an elephantoid swelling and the formation of pedicular vegetations. (Leloir.) Bacilli are also found in the mucosa in the perichondrium, and in the cartilages, occupying the intercellular spaces or the cells themselves. (Neisser.)

The integument seems to be the primary seat of the parasite; later it invades the plasmatic fissures and ficulty in differentiating them will disappear when the clinical characteristics of both diseases are carefully observed. In the former the tumors appear small and rounded and at the same time they are limited by well defined borders which separate them from the surrounding healthy parts; they are also associated with itching.

Polymorphous erythemata and erysipelas are also diseases which may be confused with leprosy, but the microscopical examination of the bacilli in the last case will solve all doubts.

Syphilides, by their situation and distribution and by the character of their ulcers having rough edges which give the typical aspect of leprosy, may also give some trouble in our diagnosis, but it can easily be solved by culture and inoculation.

We may also find the same confusion in diagnosis when we deal with the spots and patches of vitiligo, which sometimes are also associated with anæsthesia of the parts just as in leprosy. The same may be said in cases of some forms of sclerodermia.

Morvan's disease undoubtedly resembles anæsthesic leprosy to a great extent and the same may be said of syringomyelia which some writers have tried to classify under leprosy as a clinical type of unknown nature.

And finally, the local anemia of the extremities producing various trophic disturbances has also simulated leprosy, although in this case the action of the temperature and other concomitant lesions will guide us in establishing a correct diagnosis.

PROGNOSIS.

The prognosis in this disease is serious, considering the horrible hardships which the lepers have to suffer until death supervenes.

However, the anæsthetic form is less serious than the tubercular, as those suffering from the former usually live from twenty-five to thirty years. If often happens that a tubercular form may resolve into the anæsthetic, bringing on a tendency to chronicity.

Hallopeau speaks of an attenuated form of leprosy characterized by simple macules, without any other apparent lesion nor disturbances in the nutrition of the skin and the nerves.

GENERAL TREATMENT OF LEPROSY.

If from the therapeutical point of view, the cure of every leper is of primary importance, it is still more so and becomes a thing of greatest social transcendence when we consider the humanitarian end that it entails, freeing the community and the world from this scourge of mankind.

PROPHYLAXIS OF LEPROSY.

Although we are not among those who claim that leprosy is contagious, as we are among those who believe that leprosy, rather than contagious, is hereditary, an opinion which is against the belief of not a few authors of world fame, nevertheless, we are among the first to recognize the absolute necessity of isolating and segregating the lepers, for the purpose of preventing their procreation and the production of a feeble, rickety and sickly race, showing the destructive work of this terrible human ailment. To this effect, we shall take the liberty to reproduce here the series of recommendations approved by the Second International Conference against leprosy, held in Belgium in 1909. They are as follows:

FIRST. The Second International Scientific Conference against leprosy adheres wholly to the resolutions adopted by the first conference held in Berlin in 1897: (*a*) That leprosy is a contagious disease transferred from person to person; (*b*) that no country of whatever latitude is free from an eventual infection of leprosy.

SECOND. In view of the good results obtained in Germany, Iceland, Norway, and Sweden, it is desirable that all countries, where leprosy is found, should proceed to the isolation of lepers.

THIRD. It is desirable that lepers be excluded from occupations which are especially dangerous for favoring the transmission of leprosy. In every case, the strict isolation of all leper beggars and vagabonds is necessary in every country.

FOURTH. It is desirable that the healthy children of lepers be separated from their parents whenever possible and that they be placed under observation.

FIFTH. All houses inhabited by lepers should be inspected from time to time by a physician having special knowledge of the disease.

SIXTH. That all theories regarding the etiology and the manner of propagation of leprosy should be carefully studied in order to know whether they can be in accord with our knowledge about the nature and biology of the bacillus of leprosy.

It is desirable that the question of the transmisibility of leprosy by insects be made clear, and that the possibility of the presence of leprous diseases in animals be studied.

SEVENTH. The clinical study of leprosy leads us to believe that the disease is not incurable.

We do not posses a sure remedy and it would be desirable that the search for a specific remedy be continued.

CURATIVE TREATMENT.

There is an infinite variety of medicines and remedies recommended for the cure of leprosy, which, should they be enumerated, would make a large volume. I shall confine only myself, therefore, to repeat here the various methods of treatment recommended by some authorities which have been tried in the leper department of the San Lazaro Hospital, but before doing so, we are going to enumerate first the treatment of leprosy as practised by the masses in the Philippines.

It has already been stated in the beginning of this work that in the Philippines there was employed and is still being used by the quacks and ignorant people a horrible method of burying the patient alive, and now we are going to add another method, just as startling, which consists in removing all the viscera of a black cow, and then putting the patient inside the animal where he must stay for a period of two days or more, according to the instructions of the improvised doctor. Also, since the time we took charge of the leper department of San Lazaro, we notice that a great number of the patients have setons which are found in the arm, the calf, the leg, or other part of the body. We all know what a seton or fonticulus is and therefore it need not be described here, but it should be stated that, according to the quacks, the fonticulus, while fresh and suppurating, is a preserving sore which prevents the development of leprous lesions, although we have failed to notice any positive benefit which could be ascribed to such a filthy and primitive method.

From among the classical remedies tried by us, we shall mention, in the first place, the chaulmoogra oil, which is the remedy considered up to the present time as a panacea and the only specific remedy for the cure of leprosy, administered either as an ointment applied to the lesions or in drops by mouth.

The "antileprol" prepared by the Bayer Co., in capsules of 1 c. c. each, is the essense of the chaulmoogra oil, slightly oily, very fluid, having the same odor as the oil, and an ambar color. These capsules are administered, in accordance with the instructions of the firms, beginning from three capsules which are taken daily as long as the patient can tolerate, and gradually increasing the dosage as the treatment progresses.

I had occasion to test the effects of this drug ("antileprol") on a patient, named B. B. who offered himself voluntarily for this purpose. While he was taking only three capsules daily he tolerated it well without any noticeable alteration in his condition; but as soon as it was increased in accordance with instructions, he began to show great repugnance to the medicine and at the same time such intolerance that he was not able to retain it for any length of time as he vomited soon after the capsules were administered. In order to be sure of obtaining some positive results from the new medicine, I continued, however, to administer the same capsules coated with salol and other substances sufficient to mask at least the appearance of the medicine, but the results left much to be desired, as all the symptoms continued to aggravate the disease. I communicated the results of the "antileprol" to its manufacturers in accordance with their wishes.

In my letter to the German firm, I asked them to prepare for me some ampulles of antileprol mixed with some other substance which would attenuate the pain caused by the oil when injected alone. At the end of two months I received from them samples of antileprol combined with cychloform 2 per cent, and also some ampulles of 5 per cent antileprol, calling my attention that I could also add camphorated oil in order to render the injection of antileprol less painful.

In order to test these two different solutions (2 per cent and 5 per cent) at the same time, I selected two patients who willingly submitted themselves for the experiment. The first case, whom I gave the 2 per cent solution, did not show any improvement and the disease seemed to have become rather stationary; but he showed signs of moral decay and it was not going to be very long before the morbid process would become accentuated seriously menacing the life of the patient. I administered the 5 per cent solution to the second case, but the leprous patches became tubercular, the patient thin, and the heart very weak.

In view of these negative results, and from what I learned in my previous experiments, I prescribed chaulmoogra oil with camphorated oil, resorcine, and others. The camphorated oil was used as a cardiac tonic and at the same time, as we shall see later on, to contribute to the hyperleucocytosis and to the phagocytic action.

This modification which I had made of the preparation by the well-known Boie dispensary in Manila, was the basis of the first injections of chaulmoogra oil that were administered to my patients in San Lazaro Hospital.

We have also tried the oil of Hidnocarpus inebrians, the oil of *kanti* of the natives, the tincture of *zarzaparrilla,* petroleum internally and externally, as well as chaulmoogra oil, mercury, arsenic, potassium iodide, ichthyol as recommended by Unna, potassium chlorate in large doses, subcutaneous injections of europhan, resorcine, sodium salicylate, chrysophanic and pyrogallic acids, and the balsam of Curjun.

We have also employed boric acid compresses and sublimate solution of 5 : 1,000, carbolated oil, esteresol (a carbolated preparation by Derlioz), iodoform and di-iodoform. Unna used for the protection of exposed parts a varnish of casein. Finally we may mention Koch's lymph injection, having obtained unfavorable results from all of them.

Serotherapy has also been used in the treatment of leprosy, and it has been diligently pursued by Carrasquilla and Laverde without obtaining the desired results, and Metchnikoff made some preliminary tests with a hemolytic serum which did not satisfy him and now he is trying to get better results with a leucolytic serum.

There have also been some experiments made by the pathologists of the Bureau of Science of the Philippines and they are as follows:

Local applications of compressed air, in the form of a white fuming substance, or in the form of a bar, of about 10 centimeters long by 5 centimeters wide, very friable, applied to the leprous neoplasms. Its effect was caustic, but the patient could feel only cold instead of pain and as soon as it was applied to the neoplasm, the latter disappears as if a red hot iron had been applied to burn it off. On the third day, the surface thus treated is covered with a rough moist slough with thick and inverted borders. These sloughs, when they are cast off, leave a sanious ulcer containing a large quantity of leper bacilli, while the symptomatologic picture of the disease continues to develop.

Another experiment has also been made in the Bureau of Science with the juice of the meat of the cocoanut (cocoanut milk), mixed with chloroform, and used for enema in solutions of 5 per cent and 10 per cent. Tests were made on two women lepers, young and well developed. After the application of the enema of 400 c. c. once a day, they became anesthetized and began to have vomiting, congested facies, rapid breathing and accelerated pulse. They fell into a profound sleep for five or six days, and when they were awakened they complained of extreme weakness and remained in a semiunconscious condition for more than a week. This experiment was made three times a month, and in view of its failure it was finally discontinued.

An army surgeon selected 25 patients, all positive to leprosy, half of whom had syphilitic complications. They were all injected with 606, intravenously, every four or five days, with potassium iodide administered internally. The result of the experiment was that they all suffered from giddiness, watery stools, continuous tympanism and vomiting. At the end of two months, some of the patient developed eruptions similar to those of measles, conjunctivitis, slight fever, inapetence, and finally, one of them developed insanity.

By recommendation of the Bureau of Science (Manila), hypodermic injections were also made of "vaccina" from ½ to 1 c. c. There are two kinds of vaccina: One is made from the serum of live leprosy bacilli and the other from that of the dead bacilli. The results obtained from these injections are that some patients developed eczematous eruptions, while others showed herpetic, vesicular eruptions which later became ulcers. Some of the patients died from pulmonary tuberculosis. There were 49 persons submitted to this treatment, among men, women, and children under 15 years.

Those who submitted exclusively to this treatment died, while those who, besides the injections, took some bitter tonics, chaulmoogra or cod liver oil, syrup of iodated radish, sodium cacodilate and other restorative medicines, without the knowledge of the physicians who were giving the injections, are still living, some in Culion and others in Manila, to tell what they did. These experiments lasted about one year and a half, and it must be remembered that those who died were in the majority robust and strong, one of whom was an American, named T. D., who, after seven months of the experiment, became so weak that he could scarcely move in his bed and could not keep himself straight when standing. He died from tuberculosis. A Spanish mestizo, R. V., who was submitted to the treatment for three months, developed fever in the evenings, and was confined in bed until his death. Three Filipinos, between 20 and 30 years of age were also treated in the same way, but the first, C. C., had hemoptysis five months after, dying on the eighth month; the other, F. C., developed Pott's disease after ten months from which he died, and the last, M. B., after two months with the treatment, began to have chills in the evening, persistent cough, inapetence, loss of weight and finally he died. Others had to be transferred to Culion as they refused to be treated any longer with such useless medication.

The following patients were submitted to the X-ray treatment:

A. M., 22 years, married, well developed, having anæsthetic leprosy, vitiligo spots on the back, and clubbed hands.

B. M., 20 years; of fair constitution; had mixed leprosy, with patches in the face, anæsthesia, atrophy and ankylosis of the fingers of the left hand.

The local application of X-ray, for the period of 10 minutes and at the distance of 5 inches, produced, within two months of the treatment, an irritation in the parts exposed and the fall of the hair in the same regions. The white leprous patches became black and when they desquamated, they left white spots. Sometimes, eczematous eruptions appeared which coalesced forming a superficial suppurating ulcer. The disease in the meantime followed its evolutionary course without any appreciable improvement, the patient continuing to have loss of appetite and general weakness.

In 1906, during the month of November, a new, complete, and powerful X-ray apparatus was installed in the hospital, and 28 patients were selected for treatment: Eight women and 20 men. The duration and method of application of the X-ray was the same as already described. After three months of this application, black coloration appeared in the parts treated and in the roots of the nails of the fingers and toes. Six months after, 1 patient died, 19 remained in the same condition, 4 became thin, and 4 worse. Later on, during the last semester, 1 more died, 1 became blind, 10 stationary, and the rest aggravated.

The experiments made with the Cuban red Mangrove, using the alcoholic extract, in doses of 45 grams daily, gave the following results in three cases, the first of which was a case of tubercular leprosy, the second, maculous leprosy, and the third, maculous leprosy in its most advanced stage:

In the first case, the leprous tubercules were greatly irritated and the patient complained of giddiness, vomiting, constipation, and some times mucous diarrhea with tenesmus. The clinical history of this case is not complete as the patient was removed to Culion.

The patches in the second case became very red and new tubercular macules made their appearance on the elbow and the back of the left foot; otitis developed until the patient became completely deaf; also giddiness, hemoptysis, cough which resisted all treatment, and exhaustion associated with the most advanced symptoms of the disease.

The third patient died two months after and from the autopsy it was found that he had pulmonary edema, pericarditis, and parenchymatous nephritis.

Regarding the experiments with Nastina B., B1., B2., Bk., and Bo., four patients were submitted to the treatment, receiving injections of the medicine, 1 c. c. every eight days for the period of one year and a half. The results were unsatisfactory as there were ulcerations of the parts injected, and there was no improvement in the symptoms.

INTRAMUSCULAR INJECTION OF CAMPHORATED CHAULMOOGRA OIL.

In order to fight the disease, it is necessary not only to know its etiology but also its pathogenesis upon which the therapeutical treatment is to be based.

Once the physiological functions are disturbed by the action of the bacilli of Hansen in the individual, as the consequence of a previous struggle in which the organism reacted in defense of its functional integrity, and by means of an imbrication of defensive mechanisms, the morbid process progressively begins its evolution in the intricate human body which now concentrates all of its action in the destruction and expulsion of the leprosy bacilli which, just as they have adapted themselves in the beginning, are now gaining ground and increasing all their toxic activities. But, when the defensive power of the organism is weakened by a previous pathological predisposition, or by a deficient functional activity, then life ceases giving the virulent infection a wide field of development and destruction.

Returning for a moment to the pathological anatomy of the disease, we find, in the first place, a more or less deep degeneration of the parenchymatous cells, complex irritations of the vascular walls and especially of the constituents of the lymphatic tissue, and an hypergenesic process or neoformation of leucocytes and large phagocytes which protect the individual from the invading bacteria and all the elements which have ceased to be useful to the organism.

Therefore, in order that the treatment may be positive in all of its extent, it will be necessary to destroy, extirpate and eliminate the bacilli together with the other altered or destroyed elements that go with them during the evolution of the morbid process.

The bacilli expel all their noxious secretions provoking the multiplication of leycocytes which are to contribute actively to the defensive task required by the organism against any attack of bacterial infection, making it immune as much as possible. On the other hand, the phagocytic cells receive in their protoplasm all the bacilli and in this way continue their destructive work; but it has been observed that the virulence of the microorganisms may be such as to attenuate or even suspend phagocytosis and also to reduce leucocytic diapedesis, as soon as the bacilli find themselves free from the defensive phagocytic reaction of the patient; thus accelerating the development of the infection.

In a microbic infection, the large and small phagocytes protect themselves by either positive or negative chemiotaxis.

The myeloid leucocytes posses a proteolytic ferment which breaks up the complex albuminoid molecule and with this ferment an intracellular proteolytic digestion of the microbes is carried on by the phagocytes. In this way the toxic products thus digested never come to mix with the plasma of the blood which supplies all the tissues of the body, especially the nervous system which in the presence of the microbes may undergo the consequent necrobiosis. If the leucocytes are overpowered and the microorganisms persist and an extracellular struggle takes place, the human organism runs the risk of reabsorbing the toxic products of such extracellulary digestion, which will act upon the albuminous substances, causing a general reaction which is manifested by a hyperemia, although this might be also a simple phenomenon of intense leucocytolysis.

Just as we have seen that the proteolytic ferments dissolve the albuminoid substances, the lipolytic ferments take part in the digestion of fatty substances and those of the dead leucocytes in a pathological process. The lipolytic ferments complete the work of defense and destruction of the bacilli by the leucocytes, as either of these ferments, the proteolytic and the lipolytic, is unable to effect bacteriolysis.

These vital leucocytic ferments play, then, an important role in the defense of the organism; they degrade any albumen or fat from whatever source, and for this reason, it will be seen that, by exciting their local or general production, we secure a positive means of defense against a microbic invasion which consists in attacking, in the first place, the serous or albuminous sheaths of the bacilli, rendering them powerless against the leucocytes and other means of defense of the organism.

Therapeutics, in this case, is activily and directly applied, based upon all this cytologic knowledge, and doing away with a great part of the empirism upon which, until recently, the treatment of leprosy was based.

Cajal, an eminent authority, states:

> In my opinion it is in this way that the treatment known as substitutive acts upon chronic microbic phlegmasia, that is, accumulating in the theater of the struggle a larger contingent of leucocytes as well as an eliminating and bactericidal exudate which is much more efficient. (Ant. Pat., Dr. S. R. Cajal.)

By procuring, then, a great affluence in the organism of such effective means of defense, through the provocation and irritation of the secretory and dialytic functions of the corresponding organs, we shall undoubtedly succeed in eliminating and discarding so many noxious and foreign elements which hinder the functional integrity and take a principal part in the pathogenesis of a disease. And, in case that this aggregation of biological phenomena of the leucocytes is not a sufficient means of defense and repulsion against any microbic attack, we have on the other hand the *opsonins* in the blood serum, which are highly bactericidal substances, acting in such a way as to permit phagocytosis to develop freely and extensively for the destruction of invading bacilli, the first phase of its defensive activity being indicated by a rise of the opsonic index. In that way, the organism is protected to react defensively against any attack affecting its anatomo-pathological integrity.

Now then, coming to the subject of our formula for the treatment of leprosy, we say that the oil of chaulmoogra, upon entering the organism through an intramuscular injection, provokes a hyperleucocytosis, that is, a large number of white cells which, with their coat of lipoid matter, proceed to digest the fatty element of the oil of chaulmoogra, and in doing this, they excite the production of a larger number of defensive cytologic elements, which, by means of their digestive ferments, enhance the bacteriolytic power of the phagocytes, which absorbs the bacilli of Hansen, enveloping them in a mass of antibodies which inhibit and destroy them to be afterwards eliminated through the natural excretory organs of the organism. I believe that the oil of chaulmoogra spreads open, leaving the gynocardic acid free, the physiological action of which, although not yet known, ough to be supposed to be the same as that of all the fatty acids upon the organism. On the other hand, the separated fat, after exciting a hyperleucocytosis, is reabsorbed or expelled by the organism through the various excretory organs.

After injecting 2 c. c., for example, of pure oil of chaulmoogra, unmixed with any other drug, into a leprous neoplasm, the latter is converted at the end of eight or nine days, into an abscess, which contains, besides pus mixed with blood, some oily vacuoles which float in the contents of the abscess and which do not dissolve in water.

I believe it worth while to put on record an experiment upon which the formula of my treatment is based. Sometime in 1909, the Director of Health, Dr. Victor G. Heiser, instructed me to treat some lepers with the chaulmoogra oil administered in drops. I selected a patient named Basilio Dacanay, suffering with macular leprosy, whom I gave every day 5 drops of chaulmoogra oil in progressive doses. 1 tablet of strychnine sulphate three times a day, and a warm bicarbonated bath every two days. The result of this treatment is as follows: The vomiting which in the beginning was already frequent increased from day to day, as well as the diarrhea which accompanied it; the loss of appetite was absolute, the mere sight of any food being enough to cause disgust and repugnance; continual giddiness; a sense of warmth in the body; profuse cold sweating; and general break down, all of which made him indifferent with his surroundings. In view of the failure of this treatment, I did not hesitate to use the oil of chaulmoogra according to my formula, and administered by intramuscular injections. I first tried it on monkeys, dogs, and rabbits, before giving it to my patients. Its injection intramuscularly in the animals produced abscesses, while intravenously it caused death a few hours after its administration.

The patient himself, Basilio Dacanay, after recovering from the disturbances caused by the administration of the oil of chaulmoogra in drop doses, was submitted by me to the first injection of 2 c. c. of pure chaulmoogra oil, previously heated to 40° C and the result was that an abscess was produced, which contained a bloody pus and fat globules. At the same time that I made the injections on this patient, I tried them on another patient who was of a more robust constitution but less advanced in the disease, with the result that another abscess was formed which was reabsorbed leaving an induration without fluctuation. In this respect it differed from the first case in which I had to open the abscess in order to make the necessary antiseptic treatments.

These experiments show beyond doubt that the local application of chaulmoogra oil, where the lepromatous processes are developing, or where a protection is needed to destroy and counteract the infection and functional deficiency, is the right therapeutical application of the durg which, by means of its fat, inhibits the development of leprosy. The oil of chaulmoogra provokes in the organism a reaction, awakening in it, while it is in a state of atony, all the latent energies that it can produce in such a critical moment as the development of the infection, by sending to the place of invasion all of its leucocytes to take charge of the defense, either by swelling up the capillary vessels or forming phlegmasia with the diapedized cells and several other newly formed elements, which serve to relieve those already overpowered by bacteriolysis and cytolysis. Basing upon these facts, I prescribe the following formula:

Camphorated oil 10 per cent	aa 60 c. c.
Chaulmoogra oil, pure and sterile	
Resorcine	4 grams.
Purified ether	2.50 c. c.

Misce. Sig.: For intramuscular injection.

The principal action of the oil of chaulmoogra depends upon its fatty component which makes the organism react at the site of infection, and upon its gynocardic acid which acts as an alterative for all abnormal elements found in the focus of infection.

Camphorated oil, on account of its oil, helps the oil of chaulmoogra and besides that, it acts independently upon the heart and is at the same time, a recognized therapeutical agent which constantly increases phagocytic activity.

The antiseptic action of resorcine is also equally known (diatomic phenol), namely delaying the decomposition of organic substances, and in the case of lepromatous neoplasms, it prevents such a decomposition, and allows the organism to eliminate all other foreign elements which may cause a functional desintegration, such as the toxins, bacillary colonies, and cellular detritus.

In brief, we can explain the cure of leprosy by the action of the oil of chaulmoogra, in the following manner:

The organism repels the bacillary invasion due to the concurrence of a larger number of defensive elements as the leucocytes which posses phagocytic powers to destroy and exterminate the bacilli. In order that the organism may acquire a greater number of leucocytes for its defense, a stimulant or reactive is needed to provoke leycocytic hypergenesis, such as we are able to acquire from the presence and action of a fatty substance as the oil of chaulmoogra which also contains gynocardic acid, an alterative, acting upon the system as all other organic acids.

The immediate effects felt by the patient after having taken an injection of my formula of chaulmoogra oil are the following:

At the moment of the first injection, the patient feels only a slight pain; but after a number of injections, the pain becomes more intense accompanied with slight fever, pain in the bones, cephalalgia, and coughing, when the patient can not breathe through the nose due to the presence of pituitary lesions; while the macules become intensely red. When the intramuscular injections are not deeply made, some blisters appear over the macules containing at first a white serous fluid which gets darker and darker until it becomes as black as ink. These blisters are the seat of itching and pruritus, and upon breaking, they discharge a serosanguinolent fluid exposing some superficial ulcerations which can be cured by antiseptics. The scars left by these ulcerations, however, are scarcely perceptible and the black color which these spots formerly had, turn yellowish and then white, commencing from the borders and gradually spreading inward.

When the injection is deep, no blisters are produced, and the leprous patches do not leave any trace after their disappearance.

The local effects of these injections are: Swelling of the neoplasm, redness, pain, and heaviness; the skin becomes smooth and shiny as if varnish were applied; and ten or fifteen days after the injection the neoplasm softens, takes on a purple color, and then gradually atrophies until it sinks down into the healthy parts surrounding it. In some instances the neoplastic tumor disappears with the spots which characterize it, acquiring the normal color of the skin or mucosa around it.

The injections act by making the leprous tubercles disappear within a short time of the treatment if the lesions are new. If they are already hard and resistant, it takes a longer period to get results, but the lesions will likewise disappear.

When no blisters appear in the leprous lesions, upon the site of the injection, some eruptions develop instead, resembling sudamina or eczemata, sometimes in the form of circles, characterized by troublesome itching. These eruptions frequently appear also in other parts of the body which are not affected by the disease.

In the anæsthetic form, during a certain period of time after the first injections have been made, some red, smooth, anæsthetic patches appear, accompanied sometimes by fever, chills, and pain in the bones, which disappear after a few weeks without any change or modification of the lesions. When the anæsthetic form is on the way to recovery, sensibility reappears in various scattered points of the anæsthetic regions which spread gradually until they coalesce, thus recovering the former sensibility of the regions affected, with the exception of the ankylosed or completely atrophied extremities and those in which the disease has been developing for fifteen or twenty years or longer.

Recovery has been obtained in every form of leprosy; the patients present more freedom in all their movements; the evening fever disappears; there is more animation and activity of the mind; before the patients were dull and taciturn; now, they are happy and full of life; the rheumatic pains caused by the frequent contractions of the articulations disappear; and the sleep becomes sound and repairing.

The circulatory system becomes normal with the disappearance of tachycardia; perspiration becomes profuse at the least exertion but it does not weaken the patient; the urine increases in amount, and becomes frequent, but without any alteration in its elements.

Appetite is improved and the patient always feels hungry. The bowel movements become regular. However, when diarrhea appears, especially if it is bloody, the treatment is to be suspended temporarily and this is enough to stop it, within one or two weeks. Finally, the patient gets fat, his genetic impulses are increased, and in the females, the catamenial flux is reestablished.

Technic of the injection.—It should never be intravenous but intramuscular and deep. The needle is first introduced through the whole thickness to the bottom of the neoplasm and then the syringe filled with the solution is united with it. One cubic centimeter is injected on the first day, and the dose is gradually increased by 1 centimeter until 8 or 10 c. c. are given; but usually there is no patient who can stand the pain after an injection of 10 c. c. Such injections should be made with special care by the physician, as either on account of the advanced stage of the disease, or by the intercurrence of any other disease which aggravates the condition of the patient, an unexpected complication may occur, giving rise to a process which is different from that which is being treated. For this reason, the injections should be given by the doctor himself, as no one knows better than he concerning the disease and the patient with all the circumstances about him. During the first month of the treatment, I usually make the injection every other day; during the second and third months, every four days; while during the succeeding months I continue to increase the interval between the injections just as the doses are increased, bearing always in mind the rules of asepsis, and the complications which have already been mentioned, as bloody stools which, although in fact they are not serious, should be prevented not only because they may lead into another similar disease, but also because we have to prevent any anxiety on the part of the patient who may think that we are indiferent to him or ignorant.

The regions selected for the injections are the fleshy portions of the body as the gluteal region, the calves, thighs, arms, etc. Above all, the injections should be made into the neoplasms, and they are only made in other parts of the body when the neoplasms have already been injected and are painful and ulcerated, or when they have already disappeared but the physician continues nevertheless to treat the patient to make himself sure of his complete recovery, applying the injection indiscriminately to any region of the body during a certain period of observation.

CONTRAINDICATIONS.

The tubercular lepers should not be injected particularly when they have hemoptysis; also those having acute or chronic dysentery, or eruptive fever, especially smallpox and measles, as the temperature in these cases is increased and there is delirium and serious cerebral disturbances. The injection is also contraindicated in the very advanced stages of the disease when the lesions are deep and there are neoplastic suppurations and also in leprous women suffering from metrorrhagia.

HYGIENIC TREATMENT.

Exercises in the open air for three or four hours every day is useful, but damp, cold or excessively warm places should be avoided.

Sleep of at least eight hours' duration every day, change of clothing and absolute cleanliness every day, absolute prohibition of sexual relations; isolation of the patients according to the stage or period of the disease in which they are found, are indispensable for the success of the treatment of leprosy. Healthy relatives should avoid any contact or relation with the patients.

FOOD AND DRINK.

The régime should be such as to provide the organism with substances rich in lipoid matter, which greatly aid in the therapeutical treatment. If such substances ingested with the food pass to the blood, it can readily be seen by everyone that we endeavor in that way to place the patient in a condition which will enable him to defend himself by means of his medicines as well as by his food. We, therefore, strongly recommend milk, brains, calf's maw, butter, etc. The patient should have frequent meals in moderate quantities in order to prevent disgust and loathing and to enable us to prolong the diet.

Egg yolk is also a very good food for the leper, although in reality there is an objection to it and that is that it often provokes intestinal fermentation and constipation and may therefore lead to a slight intoxication which will interfere with the course of the disease and the desired effects of the treatment. To avoid this, it should be given moderately. The same thing is true with milk and for this reason it is necessary to make the patient rest from time to time, between meals, in order to quiet his stomach. Fish in oil is also rich in fat and therefore is very commendable. Gravies with ordinary fat are not good; they do nothing but to overwork the digestive system.

We must also remember that we can find very good foods, containing a great amount of fat in such organs as the lungs, liver, kidneys, etc., of cattles and swine. They may be employed alternating with meat, milk, and things of this kind, with benefit to the patient.

There is also a great advantage in furnishing vegetables and beans, as peas, lentils, lima beans, kidney beans, chesnuts, etc., which are useful for the repair of the losses in nitrogen, phosphorous and other elements which are the cause of the exhaustion of the patient. Finally, we must not forget to use in the diet of the lepers herbaceous vegetables because the lime, magnesia and iron that they contain is very useful. With respect to fruits, the lepers may have any kind they wish to have.

Drinks.—Any water may be used: Natural, filtered, sterilized, or thermal, depending upon the complications that may arise; but alcohol should be absolutely prohibited.

CURED CASES OF LEPROSY.

As an appendix, and because of the impossibility of citing every case of leprosy which has been cured by the injection of the oil of chaulmoogra according to my formula, I can give only here the extracts of the clinical histories of some of the patients who have been cured or improved, preferably those who were photographed at the time of their admission to and discharge from the hospital.

CASE I. B. D., a native of Bacnotan, La Union, P. I., 31 years of age; married; streetcar motorman; admitted to the hospital February 7, 1909. No anamnestic hereditary data. One year before suffering the disease, he had a venereal affection and tetanus.

The first leprous patches appeared over the temples, gradually extending to the ears; later they appeared on the arms and calves, then in the checks, where they became deep red in color and shiny but without any pain or itching.

The blood examined microscopically was positive to leprosy.

This patient was submitted to the chaulmoogra oil treatment given in drops, with pills of strychnine sulphate, from February 15, 1909 to the end of February of the following year, without any positive improvement. He also took several injections of crude chaulmoogra oil every eight days, without any result but the formation of suppurative abscesses. He was also treated with other kinds of medicines and injections of different forms of chaulmoogra.

From July 12, to December 13, 1910, all treatment were suspended, and he was placed under observation during which the blood was always positive to leprosy.

In January 1911 I gave him the first intramuscular injections of my formula, and on March 13, 1911, the blood showed that the Hansen bacilli were in a condition of disintegration.

On May 7, 1911, his blood was again examined with a negative result.

CASE II. C. A., of Piddig, Ilocos Norte, P. I.; 29 years of age; married; school teacher; admitted in the hospital May 29, 1909.

No hereditary antecedents; does not remember having suffered previously from any disease resembling the present one.

When he was admitted to the hospital, he had already been suffering from the disease for six months. It began by a single pink hard spot about the middle of the base of the nose. The lobule of the left ear was thick and reddish. Analysis of the blood from the ear gave positive results to leprosy.

He was treated with the "vaccinia" for a year beginning August, 1909. During the treatment he developed two new patches on both cheeks, one on the right buttock and there were diffuse inflamations of the feet.

Since September 2, 1910, he took crude oil of chaulmoogra in drops but it had to be discontinued November 5, on account of the serious digestive disturbances caused by the treatment.

On the 15th of November, he began to take the intramuscular injections of my formula and at the end of three months all the leprous patches became attenuated in color, some acquiring a dark color while others a pale hue.

The microscope revealed the absence of the leper bacillus.

By way of observation, the treatment was suspended and the patient isolated from the other patients from May 6 to December 19, 1911, when another examination was made of the blood taken from the places where he previously had leprous lesions, but the result was negative.

CASE III. B. R., male, age 42, Filipino; negative family history. Had smallpox during infancy and frambesia at the age of 6 years. Admitted on October 12, 1909. Since 1908, a small patch appeared on the sides of his nose which spread gradually towards the face and other parts of the body.

Later, the cheekbones and the ears became the seat of lesions; the skin of the arms and legs became dry and wrinkled, and he lost the sense of smell. The microscopical examination confirmed the diagnosis of macular leprosy.

He was treated with injections of vaccinia from the Bureau of Science, for ten months from October 1909, without any satisfactory result. The same result was obtained with antileprol given first in capsules and later by injections. On January 1913, he began to be treated with my preparation of camphorated chaulmoogra and on November 12 of the same year the patient was completely cured and also negative to the leprosy bacilli in the microscopical examination of the blood.

CASE IV. G. A., from Binondo, Manila, 21 years of age; married; a seamstress; admitted to the hospital January 7, 1910. No hereditary antecedents of leprosy; does not remember having previously suffered from any other disease of importance.

Her present disease began in the form of white circular spots on the cheeks, forehead, and chin, which became red at the end of a year. She then began to take various medicines, advised by other persons, and also had fonticles opened on the right arm and both legs.

Her lesions were very red patches, without thickening, over the cheeks, forehead and chin. The analysis of the blood from the cheeks was positive to leprosy. She was submitted to treatment with vaccinia, by injections; but at the end of five months she had new eruptions in almost the whole body accompanied by chills and marked loss of weight. The eruptions on the left leg suppurated and produced dark scars after healing.

On September 1910, the vaccinia treatment was stopped and she began to take chaulmoogra oil in drops but without any positive result. Finally, on February 1, 1911, he began to receive injection of chaulmoogra camphorated oil and sodium bicarbonate bath, and after three months of this treatment, the red patches commenced to lose their color, becoming pale, until it returned to normal. On May 6, 1911, the patient was isolated for observation as the blood was already negative to bacillus of Hansen. On July 15 and October 30, 1911, her blood was again examined with the same negative result.

Further examinations were made on August 3, 1912, and June 5, 1913, but the blood was always negative. She was discharged June 13, 1913.

CASE V. A. E., age 25; Filipino. Admitted December 5, 1910. Negative family history and only remembers that he suffered with mild fevers, catarrhs and measles.

Six years before admission, some small spots appeared for the first time on both cheeks, which were prominent and red, spreading afterwards to the forehead and ears.

At the time of his admission he had an injected, sclerotic, enlarged, red, and shining cheekbones, thickened nose, inflammation of the pituitary membrane with muco-pus secretion; the borders of the ears tuberculosed; the skin dry; the fingers edematous; alopecia; evening chills; and moral depression. The blood taken from the lobe of the ear the day of admission was positive for leprosy.

From May 4, 1911, he was submitted to the treatment of intramuscular injections of chaulmoogra camphorated oil until November 5, 1913, when he completely recovered, with the disappearance of all the tuberculized patches, becoming active in both mind and body, and the chills and other symptoms also disappeared.

CASE VI. F. A., from Zamboanga; 12 years of age; student. Admitted on January 5, 1911. Has no hereditary anamnesis and does not remember having suffered from any other previous disease.

Two years before, two circular white patches appeared on the calves, face, right ear and upper extremities. These patches were accompanied with itching. He took several medicines to cure the disease without any positive result.

The white patches became red and prominent, spreading later to the right eyebrow, then to the lips, right ear, abdomen, lumbar region, left calf and the legs. The analysis of his blood at the time of admission was positive.

On January 7, 1911, he was given chaulmoogra oil by drops until February 15 of the same year, when he began to be injected in accordance with my formula. At the end of nine months the patient improved, the macules slowly disappeared and all the functions which at first were defective became normal.

On November 11, 1911, his blood was examined and found negative to leprosy. He was then placed under observation, and finally his blood was again examined on October 28, 1913, with the same negative result.

CASE VII. P. H., age 42; Filipino; poor constitution. Admitted on February 3, 1911. Has a leprous daughter. Does not remember having suffered any previous disease worth of mention.

His disease is of six months' duration starting as pink patches over the cheekbones which spread later to both ears and part of the neck.

He was immediately submitted to the intramuscular injection treatment according to my formula with marked improvement, the strength, appetite and sleep returning to normal, and on September 2, 1913, microscopical examination of the blood failed to show any leprosy bacilli.

CASE VIII. G. F., age 30; Filipino. Had a cousin and an uncle who are both lepers. Admitted March 24, 1911. He had herpes at the age of 20 years; also slight fevers and cough. At the age of 26 he noticed on his cheeks and ears a thick and reddish patch.

His skin presented throughout a reddish brown coloration; there was inflamation of the nasal mucosa which interfered with respiration; the nose secreted bloody mucus of foul odor; there was loss of appetite and also fever in the evening.

By microscopical examination on March 24, 1911, he was found positive to leprosy.

On April 1, 1911, he was subjected to the treatment in accordance with my formula and on November 5, 1913, the patches as well as the other symptoms of the disease had all disappeared.

His blood was examined on September 2, 1912, and on June 5, 1913, with negative results. On November, 1913, upon reexamination of the blood by Dr. Johnson, he was found positive (?).

CASE IX. F. C., from Manila; 17 years of age; admitted April 10, 1911. Negative hereditary history. Had the disease for the last sixteen months, preceded by rheumatic pains in the elbows and knees. Anæsthesia in the cubital border of the left forearm and small finger of the same side.

Presented in the face several even, round, reddish and shining patches; the lobes of the ears hanging; the posterior part of the neck with spots resembling those of the face; similar spots were also found in the chest, abdomen, back and upper and lower extremities.

Diagnosis.—Maculo-anæsthetic leprosy. Examination of blood: Positive.

Treated by injections since February 21, 1912. In June, his blood revealed the presence of disintegrated bacilli and on October 25, he was examined by the Director of Health and declared improved.

CASE X. R. V., Filipino; 64 years of age. Admitted May 3, 1911. Has no hereditary reminiscences and only remembers having had smallpox when he was 18 years of age; blenorrhagia when 20 and acute dysentery and malaria when 45. He can scarcely remember when his disease first began, but it commenced with the appearance of some slight eruption in the testicles which upon being scratched spread forming a large eruptive area. They went on spreading throughout the whole body, forming dry crusts which on separating left a serous exudate which caused pain and itching. There was also falling of the hair of the head, the eyebrows, and other parts of the body. The patient complained of insomnia, continuous fever and great depression of spirit. I diagnosed the case as one of leprosy complicated with icthyosis. The blood taken from the dorsum of the right foot was positive to leprosy.

Treated with the injections of my formula from May 1911, with lecithin and cinnamate of soda, and full baths with decoction of leaves of alder-tree and sodium borate. He was completely restored from both diseases.

CASE XI. C. A., from Calumpit, Bulacan; 48 years of age, fireman. Admitted to the hospital May 4, 1911. Negative heredity. He does not remember having had any previous disease which may have connection with leprosy.

The disease began as a pink spot upon the border of the left ear, which when scratched produced suppurative eruptions secreting a serous fluid. He thought that the sudden appearance of the auricular spot was due to contagion from an inflamation which he had three years since on the dorsum of the left foot, caused by an accidental trauma, and which due to the application of some plasters produced some eruptions similar to those which now he had on the ear.

The blood taken from the lesions, examined microscopically, resulted positive to leprosy. He was then submitted to the injection treatment from May 15, 1911, to August 24 of the same year, when his blood was again examined but now with negative result. Repeated microscopical examination on August 3, 1912, June 5, 1913, September 5, 1913 and November 4, 1913, were all negative to leprosy.

CASE XII. A. M., age 23; a resident of Caloocan, Rizal; admitted on September 10, 1911. His parents are living and in good health. Does not remember having suffered from any disease other than smallpox during his infancy. He has been a leper for the last four years. The disease began with the appearance between the eyebrows of a rough, reddish, and shining spot; later another appeared on the upper lip and still another on the chin. The first spot spread afterwards to both ears thickening the borders and causing the lobes to hang down. Less prominent macules appeared successively on the chest, abdomen, back and the lumber region.

Upon the back of the arms they spread becoming rough towards the elbows and forearms, and causing the hypertrophy of the fingers of the right hand.

The lower extremities were also affected by the patches which extended from the buttocks, calves and legs, being thick in the region of the tendon of Achilles, before involving the dorsum of both feet.

Anæsthesia was prevalent in the lobes and borders of the ears, in the macular zone of the abdomen, in the lumbar region, on the right forearm down to the fingers, on the left calf, the anterior part of the right leg, the dorsum of the foot and fingers of the same side, and the internal border of the left foot.

There was loss of smell due to lesion of the nasal wall, which secreted an abundant mucus mixed with blood.

Diagnosis.—Tuberculo-anæsthetic leprosy. The blood was examined on the day of admission with positive result.

He was immediately submitted to the treatment of intramuscular injections from February 21, with other medicinal substances as prescribed, until October 25, 1913, when the patient was feeling very well, with the almost total disappearance of the neoplasms, having only the scars, some white, others dark, while the sense of smell was reestablished. Examined by the Director of Health, his condition of improvement was confirmed, and bacteriologically the examination of the blood showed the bacilli to be disintegrated.

CASE XIII. A. P., age 23; admitted to the hospital October 18, 1911. No positive hereditary history. Had smallpox during childhood. The disease appeared while he was in Washington, U. S. A., beginning as a mere spot on the right cheek, which kept on spreading and enlarging until it occupied about half of the face. In the middle of the patch there is a depressed scar caused by a surgeon's knife while he was in the States when his blood was examined there. It was examined in the hospital on admission and resulted positive to leprosy.

From October 25, 1911, he was treated with injections of chaulmoogra oil in accordance with my formula, to November 6, 1913, when he was place under observation as he was already negative in the microscopical examination.

Examination was repeated on November 4, with the same negative result.

CASE XIV. V. O., 42 years of age; admitted November 3, 1911. No positive hereditary history. He ascribes his disease to a chancre which he had when 21 years of age as three years after he had it he began to feel numbness in the fingers of the left hand until the latter became insensible, this coinciding with gradual ankylosis of the fingers of the same insensible hand. Upon the phalangeal articulations, small blisters appeared, filled with an opalescent liquid, which upon bursting, gave rise to ulcerations which insensibly extended deeply into the tisues, disarticulating and loosening the phalanges. After this initial process, the patient noticed a purple spot on the right cheek as well as on the forehead, both ears, and nose, and anæesthetic patches on the calves and legs. As the disease advanced, he developed an intense nasal inflammation, producing a bloody mucous secretion especially on waking up in the morning, and at the same time he noticed that the nose was sinking down and that he had a very obstinate ophthalmitis.

Upon examination at the hospital it was found that the corneæ were covered with a white spot which interfered with vision; the skin was thick and red on the forehead; there were no eyebrows; the superciliary region was thickened and reddish; the eyelids were enlarged and hanging; there were no eyelashes; the nose was atrophied and the borders of the nostrils tuberculized; the nasal septum had disappeared and there was loss of smell. The cheeks were enlarged and reddened; the chin and lobules of the ears were purplish, thick and hanging. The skin of the abdomen was wrinkled and presenting small black spots; the skin of the back was thick as well as that of the arm; the elbows were dark; the forearms had dry wrinkled skin; four fingers of the right hand were atrophied while the small finger and all the toes were ankylosed.

Had anæsthetic points over the posterior surface of the forearms, hands and fingers; also in the knees, the middle and lower part of both legs and the dorsum and toes of both feet.

Diagnosis.—Tuberculo-anæsthetic leprosy. The blood from a tubercle in the nose resulted positive.

Treated with intramuscular injections of chaulmoogra camphorated oil from June 15, 1912 to August 6, 1913, all the tubercles disappeared; he recovered the sense of smell, and sight became normal. The bacilli, examined under the microscope, were found disintegrated. On October 25, examined by the Director, he was reported to be greatly improved.

Case XV. H. P., age 17; admitted November 3, 1911. His father was tuberculous and he had smallpox during childhood. When 15 years of age he noticed a peculiar benumbing of the toes of the right foot; then a round, hard and red spot appeared upon the alae of the nose, chin, cheeks, and the borders and lobules of the ears with hypertrophy of the auricle, then a smooth, red spot appeared upon the back of the neck and many others on the chest, back, small of the back, arms and forearms, hands, buttocks, thighs and legs, with scaly, dry and dark brown skin. Blood analysed at the time of admission was positive. (See Plate I, fig. 1.)

Treated with my formula from February 21, 1912 to June 1, 1913, when he was found very much improved and the bacilli of Hansen could no longer be found in all the bacteriological examinations made repeatedly from October 25, to November 4, 1913. (See Plate I, fig. 2.)

CASE XVI. V. R., 78 years of age; his parents died of tuberculosis and had a nephew who died of leprosy. Admitted November 7, 1911. When 40 years of age, he suffered from rheumatism of the hip-joint, to which he ascribed the retraction of one of the lower extremities.

At the age of 75 he had some wheals in the cheeks which spread to the face and the rest of the body. At the time of admission he had conjunctivitis and hard, red spots on the forehead, nose, chin, and the borders and lobes of the ears which were atrophied; also some more extensive patches in the anterior region of the chest, abdomen, and the antero-external part of the calves and knees, and hypertrophy of the fingers and toes.

It was a case of macular leprosy. Blood resulted positive.

He was given injections in accordance with my formula from February 21, 1912, to October 25, 1913, when his blood was again examined showing the bacilli to be in fragments, while the lesions and other symptoms were very much improved.

CASE XVII. E. E., admitted to the hospital December 9, 1911. Has a leprous child and does not know of any other member of the family who suffered from the disease. When she was 49 years of age, the disease began as a small reddish spot over the left cheek, apreading afterwards to the forehead, superciliary ridges, the nose, upper lip, chin, and both ears.

Upon the trunk she also presented lesions over the right side, left lumbar region, hypogastrium, and the upper and lower extremities. (See Plate II, fig. 1.)

Treated with the injections from February 21, 1912, to October 24, 1913 when her blood was found negative. This patient absconded. (See Plate II, fig. 2.)

CASE XVIII. P. R., 12 years of age; admitted December 25, 1911. Negative heredity. His disease began seven years before; his entire face was thickened, very red and shiny; his cheekbones, nose, forehead, chin, eyelids, and ears were very prominent; several smooth, reddish patches were found in the anterior part of the neck, chest, abdomen, and genital organs; upon the back the patches were more extensive and also in the upper and lower extremities, while the toes were all hypertrophied.

There was anæsthesia on the right elbow and the dorsum of the left foot.

Diagnosis.—Macular leprosy. Result of blood examination, positive.

Subjected to the treatment from February 21, 1912, to October 25, 1913, and when he was inspected by the Director, he was found to be much improved, the microscopical examination showing but a few broken down bacilli.

CASE XIX. F. U., 13 years of age; had a cousin of the second degree suffering from leprosy. Admitted January 15, 1912.

He remembered having had herpes during childhood. Had leprosy for the last four years. There was a hard and shining spot over the right middle part of the nose, the alae of which being hypertrophied; hard and pink spots were present on the left cheek and thick and dark spots on the right; the border of the upper lip, the chin and left ear were hypertrophied; upon the trunk and extremities the skin was dry and wrinkled. Blood examination: Positive.

It was a case of tubercular leprosy. Subjected to my method of treatment from February 21, 1912, to October 25, 1913. When examined by the Director he was found improved, having but few disintegrated bacilli.

CASE XX. P. S., 35 years of age; admitted on February, 1912. No positive hereditary history. His mother died from pulmonary tuberculosis. The disease appeared two years before in the nose, forehead and cheeks as red patches, with numbness in the small finger and external border of the left hand.

Later, the red patch on the nose became black and shiny. Over the cheekbones he also had round patches, hard to the touch, a little more pronounced on the left than on the right side; the upper border of the pinna of the right ear was thick and hard; and there was a spot on the left elbow. He also had some white scars in other parts of the body due to scabies. (See Plate III, fig. 1.)

Diagnosis.—Tuberculo-nodular leprosy. Blood examination, positive.

He was treated with injections of camphorated chaulmoogra oil, as prescribed by me, from February 21, 1912, to October 25, 1913, when he was examined by the Director and found to be very much improved. The bacilli were also found disintegrated and very much reduced in number. (See Plate III, fig. 2.)

CASE XXI. A. R., 15 years of age; admitted February 17, 1912. One cousin was a leper. According to him, his present disease was of five or six years' duration. He had patches on the nose, cheekbones, ears and chin. Upon the abdomen he had small round spots, some whitish, others pink, and shiny. Upon the back he had the same spots, and in the sacral region he had one irregular in form and as dark as the color of the tobacco leaf. The skin in general was dry, wrinkled and shiny. The patches were also present on the upper extremities, with anæsthesia on both elbows, left knee, and right leg.

Diagnosis.—Macular leprosy. Blood from the ear was found positive.

He received my treatment from February 21, 1912, to October 25, 1913, when the Director of Health declared him to be much improved.

CASE XXII. L. C., 24 years of age; admitted to the hospital February 19, 1912. Family history negative. He began to have leprosy six years before his admission. The forehead was very much thickened with pronounced furrows running transversely. The eyebrows had but few hairs left; the eyelids were pendulous; the nose was swollen and prominent while the nostrils were very small due to the swelling of the borders; the cheekbones were very prominent; the lips were nodular and very much thickened; the ears were hypertrophied; the neck showed some dry, darkish spots which were also found on the forearms, hands and lower extremities. Both ears could not feel pain as well as the left arm, the tips of the fingers, and the lower extremity on the same side.

Diagnosis.—Nodular leprosy. Blood positive.

He received chaulmoogra camphorated oil by injections from February 21, 1912, to October 25, 1915. The Director declared him improved.

CASE XXIII. T. P., 30 years of age; admitted May 27, 1912. One uncle was a leper. He had white, irregular spots on the chest, abdomen, and back. The skin was dry and wrinkled. The fingers were ankylosed, flexed and hypertrophied, while the phalanges of the left big toe were all destroyed by ulcerations. Upon the sole of the right foot, there was also an ulcer. Anesthesia in the fingers, toes, and calves.

Diagnosis.—Anesthetic leprosy. The nasal mucus was positive to leprosy.

He received the treatment from June 15, 1912, to October 25, 1913, when he was examined by the Director and declared improved. The anesthetic parts were now sensible.

CASE XXIV. M. E., 39 years old; admitted September 9, 1912. Negative family history. During childhood, had smallpox. Leprous lesions began to appear in 1910, consisting of reddish spots on both cheeks which extended to the face, chest, and buttocks. The spots over the cheeks thickened and became indurated; finally they extended to the nose, eyelids, lower lip, ears, and the greater part of the trunk and the extremities.

Diagnosis.—Macular leprosy. Blood positive.

He is under treatment since January 1913, by injections with chaulmoogra, with the result that the leprous spots disappeared and the patient became much improved.

CASE XXV. J. S., 28 years of age; admitted to the hospital March 11, 1913. Negative family history. Ten months ago, he began to notice a reddening of the lobule of the left ear and a red spot on the forehead and above the upper lip. The spot on the forehead was found over the right superciliary ridge. On the cheek and ear of the right side there was also a spot of the same appearance.

Diagnosis.—Macular leprosy. Blood positive.

He is under treatment since March 13, and now he is much improved, the spots having almost completely disappeared.

CASE XXVI. (1) J. S., from Paco, Manila: 33 years of age; married; female; cigar maker; admitted September 30, 1913. Negative family history. Before her present sickness, she had moderate fevers with pain in the bones, cephalalgia and suppression of the menses. The present illness began four years before her admission to the hospital when she noticed some red spots on her cheeks, chin, nose and lower eyelid. Later, she noticed other spots on her right side. She was treated by two physicians for several years without improvement and finally came to the hospital where it was found that her blood was positive to leprosy. (See Plate VI, fig. 1.) There was anesthesia in the leprous spots.

Diagnosis.—Maculo-nodular leprosy.

The next day she began to receive the injection treatment of chaulmoogra, starting with 1 c. c. three times a day until the dose reached 10 c. c. On April 15, 1914, the blood was again examined, showing disintegrated bacilli, while clinically the patient was very much improved. (See Plate IV, fig. 2.)

The following is a synoptic table of the lepers treated with my injections from 1910 to 1912:

Recovered, blood negative	24
Improved, sent to Culion	5
Improved, clinically	15
Improved clinically and microscopically	2
Died from pulmonary tuberculosis	2
Under the period of reaction	1
Stationary	3
Total	52

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(1) This case was added at the time proofs of Spanish were being corrected, July, 1914.

CONCLUSIONS.

1. Leprosy is caused by the bacillus of Hansen. In the Philippines, it is a disease known for centuries, having been treated by various means thought best at the time they were in vogue, although they were but the fruits of fanaticism on the part of quacks.

2. Leprosy is scattered all over the Philippines, being more numerous in the southern regions from which the greatest number of our patients come.

3. Age and sex influence the development of leprosy which predominates more in men than in women. Uncleanliness and sexual excesses on the part of the patients tend to aggravate the development of the disease.

4. All pathological conditions contribute to the development of leprosy, especially when there is a hereditary predisposition, as well as all morbid conditions which predispose the individual to leprosy, with the exceptions of frambesia which serves either to protect from leprosy or to attenuate it if not curing it altogether as in the cases we have observed in our hospital.

5. Heredity is an important factor in the nosology of leprosy, as we consider it the chief cause of the disease, contagion being but a secondary factor in those cases already predisposed.

6. The symptomatology of leprosy in the Philippines does not differ from that already described in all works concerning the pathology of this disease, with the exception of some symptoms which we have described and which are attributed to the complications and idiosyncrasies of the disease but without in the least altering its period of invasion, course, forms, pathology, diagnosis, and prognosis.

7. The treatment of this disease consists in stimulating the organism in order to induce the leucocytes scattered in the circulation to gather in the sites of the infection produced by bacillary embolisms which are

the unequivocal causes of the initial leprous neoplasms in certain regions of the body. The active agent that incites and hastens this local hyperleucocytosis is the chaulmoogra oil mixed with camphorated oil in equal parts such as prescribed by me for injection. Both these oily substances cause a partial accumulation of those cytologic elements which are indispensable to procure phagocytosis such as required by biological laws in order to straighten up the physiological disturbances in the make-up of the patient. In this way leprosy which shows itself in part in certain regions of the human body is ammeliorated considerably until it is cured entirely by the injections of chaulmoogra oil and its adjuvants.

8. And finally, those cases which have just been presented are conclusive and definite proofs of the efficiency of our treatment for leprosy.